

(23,765)

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1914.

No. 208.

LEWIS E. SMOOT, APPELLANT,

vs.

THE UNITED STATES.

APPEAL FROM THE COURT OF CLAIMS.

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1 *I. Petition and Exhibits. Filed Dec. 1, 1906.*

In the Court of Claims.

No. 29903.

LEWIS E. SMOOT.

VS.

THE UNITED STATES.

To the Honorable Chief Justice and the Associate Justices of the Court of Claims:

The petition of Lewis E. Smoot respectfully represents:

1. That he is a native citizen of the United States and a resident of the District of Columbia and this claim is made in his own right and arises out of contracts entered into by the defendant, the United States, with this petitioner as hereinafter more particularly set forth.

2. That heretofore, to wit, on the fourth day of April, 1903, the defendant entered into a contract with the petitioner through its agent and representative, Lieut. Col. A. M. Miller of the Corps of Engineers of the United States Army, duly authorized in that regard, wherein and whereby it was stipulated and agreed that the petitioner should furnish to the defendant, among other things, one hundred and forty thousand, two hundred cubic yards more or less of filter sand to be delivered and put in place in the filtration beds constructed under the authority of the defendant for the filtration plant established by the United States for the purpose of filtering the water supplied by the Washington Aqueduct for the city of Washington and District of Columbia, the defendant agreeing to pay therefor the sum of two dollars and sixty-five cents per cubic yard.

3. By the terms of said contract the engineer officer in charge of the work was authorized to make alterations or changes in the quantity and quality of the work and materials to be provided by the contractor either before or after the commencement of construction and in case of such changes the same were required to be ordered in writing by the engineer officer in charge and if the amount of work should be increased, such increase should be paid for according to the quantity actually done and at the price established by the contract.

4. Your petitioner further shows that on, to wit, February 17, 1905, after petitioner had entered upon the performance of the contract and had furnished a part of the sand thereby required, Lieut. Col. Smith S. Leach, of the Corps of Engineers, United States Army, in charge of the said works, in behalf of the United States, by an agreement in writing, ordered and directed this petitioner to supply certain quantities of said filter sand in addition to that already

furnished, which quantity exceeded in amount the quantity stipulated in said contract, such excess amounting to thirty-four thousand and thirty cubic yards.

5. Petitioner further shows that in and by said written direction the said Lieutenant Colonel Leach notified this petitioner that the requirement to furnish such extra quantity of sand would be rigorously exacted of the petitioner as a minimum, and any failure on the part of the petitioner to supply the quantity so ordered would be considered by him as sufficient cause for the exercise of the right reserved to the United States in paragraph 37 of the specifications of the contract and of the discretion given to him, said Leach, in paragraph 39 of the said specifications and the right conferred upon him by paragraph 41 of the specifications of said contract.

6. Paragraph 37 of said specifications referred to in the said order of Colonel Leach reserved to the United States the right to purchase materials in the open market in case of default on the part of the contractor or delay on his part in furnishing and delivering the same, authorizing any increase of cost over that stipulated in the contract to be deducted from the payments due or to become due the contractor; paragraph 39 of said specifications authorizes the engineer officer in charge of said work, in his discretion, to suspend monthly payments to the contractor if, in the judgment of such engineer officer, the contractor is not making the progress required in the delivery of materials; paragraph 41 of said specifications gave to the engineer officer in charge the authority, in the event that satisfactory progress was not being made in the delivery of the materials as required by said officer, to annul the contract and take possession of and use all materials, animals, machinery, implements and tools of every description belonging to the contractor or found upon the work at such rental valuation as such officer in charge should decide to be reasonable.

7. Petitioner further shows that in pursuance of said written order of February 17, 1905, and under impulsion and threats of enforcement of the penalties of said contract in the event of the failure to supply such additional material this petitioner provided additional plant consisting of machinery, tools, animals and other implements at a large cost, to wit, more than fifteen thousand dollars and also purchased additional land from which to excavate the required additional quantity of sand and set about the compliance of the said order of February 17, 1905, doing and performing in that regard all things proper and necessary to supply not only the sand stipulated to be furnished under the original contract but the increased quantity so ordered within the time and in the manner specified in said order of February 17, 1905.

8. Petitioner further shows that thereafter, to wit, on the 29th day of May, 1905, while this petitioner was engaged in fulfilling his said contract and the said order of February 17, 1905, according to their respective terms, the officer in charge of said work and representing the defendant United States without right and without notice to this petitioner and without his consent and against peti-



tioner's protest reduced the quantity of additional sand required by the said order of February 17, 1905, by the amount of 16,505 cubic yards, and although this petitioner tendered himself ready to fulfil said contract and order of February 17, 1905, to supply and deliver all of the sand required to be furnished by said order, yet the said officer in charge refused to receive the same to the great damage and injury of petitioner.

9. Petitioner further shows that by reason of the failure and refusal of the defendant to accept the whole of the additional quantity of sand provided for in the said order of February 17, 1905, the petitioner lost the profit which he otherwise would have realized had he been permitted to supply the whole of the sand provided for in said order amounting to the sum of, to wit, \$27,728.40 and further was damaged in the sum of, to wit, \$15,459.64, the amount of expenditure required to be made by him to provide the additional plant, machinery, tools, etc., required to be and which actually were provided by petitioner in order to fulfill said order of February 17, 1905, and to supply the additional quantity of sand therein ordered within the time therein specified.

10. Petitioner further shows that no assignment or transfer of the said claim or of any part thereof or of any interest therein  
5 has ever been made by this petitioner, and that this petitioner is justly entitled to the amount herein claimed from the United States after allowing all just credits and offsets.

11. Petitioner further shows that a true copy of said contract with the United States of April 4th, 1903, and of the said written agreement, direction and orders of February 17, 1905, are hereto attached, marked "Exhibit A" and "Exhibit B" respectively, which it is prayed may be taken and read as a part hereof.

12. Petitioner therefore prays judgment against the United States for the sum of \$27,728.40 with interest thereon from the first day of November 1905, the amount of the profits which petitioner would have realized had he been permitted to supply the whole quantity of filter sand as ordered on February 17, 1905; and for the sum of \$15,459.64, the amount of the expenditures necessarily made by petitioner to carry out the requirements for the extra quantity of sand required by the said order of February 17, 1905, with interest thereon from the first day of June 1905.

LEWIS E. SMOOT.

WM. G. JOHNSON,  
*Attorney for Claimant.*

DISTRICT OF COLUMBIA, ss:

On this 16th day of October, A. D. 1906, personally appeared before me Lewis E. Smoot, and made oath that he had read the foregoing petition, by him subscribed, and knew the contents thereof, and that the facts therein stated on his personal knowledge are true and the facts therein stated upon information and belief he believes to be true.

Witness my hand and notarial seal this sixteenth day of October,  
A. D. 1906.

[NOTARIAL SEAL.]

OSCAR LUCKETT,  
Notary Public D. C.

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"EXHIBIT A."

Form 18a.

*Advertisement.*

Office Washington Aqueduct, 2728 Pennsylvania Avenue.

WASHINGTON, D. C., March 19, 1903.

Sealed proposals for 880,000 cu. yds. Excavation, 111,200 cu. yds. Concrete Masonry, furnishing and placing 1,100 tons Cast-iron Pipe and Specials, 3,000 lin. feet Riveted Steel Pipe, 140,200 cu. yds. Filter Sand, 42,300 cu. yds. Filter Gravel, 91,000 lin. feet Glazed Vitrified Pipe (all more or less), and Exterior Drainage System, will be received here until 12 m., March 31, 1903, and then publicly opened. Information on application.

A. M. MILLER,  
Lt Col. Eng'rs

*Specifications.*

#### General Instructions for Bidders.

1. The attention of bidders is especially invited to the Acts of Congress approved February 26, 1885, and February 23, 1887, as printed in vol. 23, page 332, and vol. 24, page 414, United States Statutes at Large, which prohibit the importation of foreigners and aliens, under contract or agreement, to perform labor in the United States or Territories or the District of Columbia.

2. Preference will be given to articles or materials of domestic production, conditions of quality and price being equal, including in the price of foreign articles the duty thereon.

3. No proposal will be considered unless accompanied by a guaranty, which should be in manner and form as directed in these instructions.

7 4. All bids and guaranties must be made in duplicate upon printed forms to be obtained at this office.

5. The guaranty attached to each copy of the bid must be signed by an authorized surety company, or by two responsible guarantors, to be certified as good and sufficient guarantors by a Judge or clerk of a United States Court, United States District Attorney, United States Commissioner, or Judge or clerk of a State court of record, with the seal of said court attached.

6. A firm as such will not be accepted as surety, nor a partner for a copartner or firm of which he is a member. Stockholders who are

not officers of a corporation may be accepted as sureties for such corporation. Sureties, if individuals, must be citizens of the United States.

7. When the principal, a guarantor, or a surety is an individual, his signature to a guaranty or bond shall have affixed to it an adhesive seal. Corporate seals will be affixed by corporations, whether principals or sureties. All signatures to proposals, guaranties, contracts, and bonds should be written out in full, and each signature to guaranties, contracts, and bonds should be attested by at least one witness, and, when practicable, by a separate witness to each signature.

8. Each guarantor will justify in a sum of fifteen per cent of the amount covered by the proposals. The liability of the guarantors and bidder is determined by the Act of March 3, 1883, 22 Statutes, 487, Chap. 120, and is expressed in the guaranty attached to the bid.

9. A proposal by a person who affixes to his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal, is the proposal of the individual. That by a corporation should be signed with the name of the corporation, followed by the signature of the president, secretary, or other person authorized to bind it in the matter, who should file evidence of his authority to do so. That by a firm should be signed with the firm name, either by a member thereof or by its agent, giving the names of all members of the firm. Any one signing the proposal as the agent of another or others must file with it legal evidence of his authority to do so.

10. The place of residence of every bidder, and postoffice address, with county and State, must be given after his signature.

11. All prices must be written as well as expressed in figures.

12. One copy each of the advertisement, the instructions for bidders, and the specifications, all of which can be obtained at this office on application by mail or in person, must be securely attached to each copy of the proposal and be considered as comprising a part of it.

13. Proposals must be prepared without assistance from any person employed in or belonging to the military service of the United States or employed under this office.

14. No bidder will be informed, directly or indirectly, of the name of any person intending to bid or not to bid, or to whom information in respect to proposals may have been given.

15. All blank spaces in the proposal and bond must be filled in, and no change shall be made in the phraseology of the proposal, or addition to the items mentioned therein. Any conditions, limitations, or provisos attached to proposals will be liable to render them informal and cause their rejection.

16. Alterations by erasure or interlineation must be explained or noted in the proposal over the signature of the bidder.

17. If a bidder wishes to withdraw his proposal he may do so before the time fixed for the opening, without prejudice to himself, by

communicating his purpose in writing to the officer who holds it, and, when reached, it shall be handed to him or his authorized agent, unread.

18. No bids received after the time set for opening of proposals will be considered.

19. The proposals and guaranties must be placed in a sealed envelope marked "Proposals for Filter Material and Work," "to be opened March 31, 1903," and enclosed in another sealed envelope addressed to Lieutenant Colonel A. M. Miller, Corps of Engineers, U. S. Army, 2728 Pennsylvania Avenue, Washington, D. C., but otherwise unmarked. It is suggested that the inner envelope be sealed with sealing wax.

20. It is understood and agreed that the quantities given are approximate only, and that no claim shall be made against the United States on account of any excess or deficiency, absolute or relative, in the same. Bidders, or their authorized agents, are expected to examine the maps and drawings in this office, which are open to their inspection; to visit the locality of the work, and to make their own estimates of the facilities and difficulties attending the execution of the proposed contract, including local conditions, uncertainty of weather, and all other contingencies.

21. The United States reserves the right to reject any and all bids and to waive any informality in the bids received; also to disregard the bid of any failing bidder or contractor known as such to the Engineer Department, or any bid which is palpably unbalanced or obviously below what the work can be done for, or the bid of any bidder who shall fail to produce, when called upon to do so, evidence satisfactory to the Engineer Officer in charge of the said bidder's ability to do the contemplated work within the required time, including his control of the necessary means and equipment. The failure of a bidder to make satisfactory progress or to complete on time similar work under previous contracts with the United States

will be duly considered in canvassing bids and may be a valid cause for the rejection of his proposal. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

22. The bidder to whom award is made will be required to enter into written contract with the United States, with good and approved security, in an amount of twenty per cent of the amount covered by the contract, within ten (10) days after being notified of the acceptance of his proposal. The contract which the bidder and guarantors promise to enter into shall be, in its general provisions, in the form adopted and in general use by the Engineer Department of the Army, blank forms of which can be inspected at this office, and will be furnished, if desired, to parties proposing to put in bids. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

23. The sureties, if individuals, are to make and subscribe affidavits of justification on the back of the bond to the contract, and they must justify in amounts which shall aggregate double the amount of the penal sum named in the bond.

24. Bidders are invited to be present at the opening of the bids. These specifications are so drawn as to allow bidders to bid on any or all of the different classes. Bidders are invited to name separate prices for the following classes and for the items under each class as outlined in the proposal.

Class A. Excavation, embankment, puddle, seeding, and sodding.

Class B. Concrete masonry, granolithic pavement, placing materials in masonry, and drainage of roofs.

Class C. Furnishing and laying steel pipes and appurtenances.

11 Class D. Furnishing and laying cast and wrought-iron pipe and special castings.

Class E. Constructing exterior drainage system and manholes.

Class F. Main filter underdrains. Interior drainage system.

Class G. Furnishing and placing filter sand and filter gravel.

### General Conditions.

25. A copy of the advertisement, and of the specifications, instructions, and conditions will be attached to the contract and form a part of it.

26. The contractor should, within ten days from the award of the contract, furnish the office with the post-office address to which communications should be sent.

27. Transfers of contracts, or of interest in contracts, are prohibited by law.

28. The contractor will not be allowed to take advantage of any error or omission in these specifications, as full instructions will always be given should such error or omission be discovered.

29. The decision of the Engineer Officer in charge as to quality and quantity shall be final.

30. Payments will be made as specified.

31. The contractor will be required to commence work under the contract as specified, to prosecute the said work with faithfulness and energy, and to complete it as specified.

32. Unless extraordinary and unforeseeable conditions supervene, the time allowed in these specifications for the completion of the contract to be entered into is considered sufficient for such completion by a contractor having the necessary plant, capital, and experience. If the work is not completed within the period stipulated

12 in the contract, the Engineer Officer in charge may, with the prior sanction of the Chief of Engineers, waive the time limit and permit the contractor to finish the work within a reasonable period, to be determined by the said Engineer Officer in charge. Should the original time limit be thus waived, all expenses for inspection and superintendence and other actual loss and damages to the United States due to the delay beyond the time originally set for completion shall be determined by the said Engineer Officer in charge and deducted from any payments due or to become due to the contractor: Provided, however, that the party of the first part may, with the prior sanction of the Chief of Engineers, waive for a reasonable period the time limit originally set for completion and

remit the charges for expenses of superintendence and inspection for so much time as in the judgment of the said Engineer Officer in charge may actually have been lost on account of unusual freshets, ice, rainfall, or other abnormal force or violence of the elements, or by epidemics, local or State quarantine restrictions, or other unforeseeable cause of delay arising through no fault of the contractor, and which prevented him from commencing or completing the work of delivering the materials within the period required by the contract: Provided, further, that nothing in these specifications shall affect the power of the party of the first part to annul the contract as provided in the form of contract adopted and in use by the Engineer Department of the Army.

33. The contractor will be required to hold the United States harmless against all claims for the use of any patented article, process, or appliance in connection with the contract herein contemplated.

34. Whenever the words "Engineer Officer in charge" occur they shall be construed to apply as well to his authorized assistants.

35. It is understood that the United States will not be responsible for accidents or injuries to the contractor's employees or plant from any source or cause.

36. Deliveries shall not be made or work done on Sundays or legal holidays, except in case of emergency, of which the Engineer Officer in charge shall be the judge. Deliveries shall be made in such manner as to keep roadways and passages clear, and not interfere with the work of other contractors or workmen.

37. It must be clearly understood that time is an essential feature of the contracts herein contemplated. Bids must be accompanied by statements sufficiently in detail to enable the Engineer Officer in charge to determine the ability of the bidders to comply with the specifications as to deliveries. All such statements shall be subject to verification, and if, in the judgment of the Engineer Officer in charge, any bidder is incapable of complying with the specifications for delivery, it shall be sufficient warrant for the rejection of his bid.

Bids are invited on any or all of the classes specified, and the right is distinctly reserved to award the work as a whole or to enter into separate contracts for the different classes, whichever may be deemed most advantageous and economical to the United States.

The right is reserved, also, to purchase the needed materials in the open market, in case of any delay in furnishing and delivering acceptable articles, and any increase of cost over that under the contract shall be deducted from payments due or to become due the contractor. All rejected materials shall be immediately removed by the contractor and at his expense.

38. The location of the work is in the District of Columbia, near the Washington City Reservoir.

39. Once in every month the Engineer Officer in charge will make an estimate of the work done and materials delivered, and the value thereof, and will pay the contractor the amount due, less ten (10) per cent, which will be retained until the completion and final acceptance of the work done and materials



delivered under these specifications. If at any time, in the judgment of the Engineer Officer in charge, the contractor is not making the progress required by these specifications, he may, in his discretion, suspend the monthly estimates and payments until such time as it appears that the contractor has reached and is maintaining the rate of progress necessary for the completion of the work within the time stipulated.

40. Contractors for work shall provide suitable and sufficient sanitary conveniences, properly secluded from public observation, and workmen shall be required to use them exclusively. Should polluting material be deposited in filters, pipes, or elsewhere upon the work, the contractor shall at once satisfactorily clear up such material. Any workman committing such pollution shall be forthwith discharged and not again employed upon the work.

41. In case the work under any contract is not being carried on as required by the specifications to the satisfaction of the Engineer Officer in charge; if satisfactory progress is not being made, or the work is abandoned; if the contractor is wilfully violating any of the conditions or provisions of his contract, or is executing the same in bad faith, the Engineer Officer in charge shall notify the contractor to fulfil the conditions of the contract; and should the contractor fail to comply within five days the Engineer Officer in charge shall have the right to formally annul the contract as provided for in the form of contract to be entered into, and to take possession of and use such materials, animals, machinery, implements and tools of every description as may be found upon the work, at such rental valuation as the Engineer Officer in charge decides to be reasonable.

42. The contracts for this work are to be made under the following item contained in an "Act making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and four, and for other purposes:

"For continuing work on a slow sand filtration plant, and for each and every purpose connected therewith including the preparation of plans, and for the purchase of such scientific books and periodicals as may be approved by the Secretary of War, six hundred thousand dollars, to be available immediately and until expended: Provided, That all contracts authorized under appropriations for the slow sand-filtration plant shall provide for the completion of the work on or before December first, nineteen hundred and four: Provided further, That the amount for which a contract or contracts may be entered into by the Secretary of War for such material and work as may be necessary for prosecuting the work on said slow sand-filtration plant, and for each and every purpose connected therewith to final completion within the shortest practicable time, or within which the materials may be purchased and the work done otherwise than by contract, to be paid for as appropriations may from time to time to time be made by law, is hereby increased from two million seven hundred and sixty-eight thousand four hundred and five dollars to three million four hundred and sixty-eight thousand four hundred and five dollars."

In case the available funds become exhausted before the completion of contract the Engineer Officer in charge will give thirty (30) days' written notice to the contractor that work may be suspended; but if the contractor so elects, he may continue work under the conditions of the specifications, after the time set by such notice, so long as funds for proper superintendence and inspection are available, with the understanding, however, that no payments will be

16 made for such work until additional funds have been provided in sufficient amount. When additional funds become available for continuing the work, the Engineer Officer in charge will give thirty (30) days' notice to the contractor that work must be resumed. Should payments be discontinued for a period of one year owing to lack of funds, the total amount reserved from previous payments shall be paid the contractor, it being understood that such payment will in no respect release the contractor from his obligations under the contract, but that the contract and accompanying bond are to remain in full force and virtue the same as if such reserved percentage had not been paid.

Amount available about \$2,030,000.

#### Work to be Done under These Specifications.

43. Work.—The work to be done under these specifications consists in making, furnishing, building, and placing the excavation and embankment and fill, the concrete masonry, the filter sand and gravel, the granolithic pavement of the courts required for the construction of a system of filters and pure water reservoir, and the pipes and drains pertaining thereto. The cement for the concrete, and certain other materials shall be supplied by the United States.

44. These specifications do not include the sand washing apparatus, regulator houses and fixtures above the substructures, the track system, pumping station and appurtenances, and other parts of the complete plant to be otherwise or subsequently supplied.

45. Plans.—The general extent, location and character of the work are shown by a set of 23 plans, numbered from 1 to 23  
17 consecutively, which plans are made a part of these specifications, and which plans are on file at the office of the Washington Aqueduct.

46. Plant.—The complete plant as shown by the plans includes 29 filters, with net areas of about one acre each. Of these filters 1 to 24 inclusive shall be built first. The embankment under filters shall be completed for filters 25 to 29 inclusive, in connection with the first part of the work and other parts of filters 25 to 29 shall be done by the contractor at the unit prices provided in these specifications, if the same shall be ordered, in writing, by the Engineer Officer in charge, at least two months before the completion of the masonry in filters 1 to 24 inclusive, but the time of the completion of the work to be done under these specifications shall apply only to filters 1 to 24 inclusive, and in case the contractor is ordered to build the remaining filters under these specifications, an additional nine months shall be allowed for their completion after the time provided for the completion of the rest of the work.



## A. Excavation. Item No. 1.

47. Work.—The work to be done consists of all the clearing, grubbing, and excavating necessary to prepare the site of the filtration beds for the erection of the masonry structures, in accordance with the plans on file in this office. The structures for which excavation is to be made include the filters, clear water basin, gate-houses, court paving, and similar structures, and the central drains of each filter. The excavation and refilling for pipe lines and other drains is not included under this item.

48. Clearing.—The land shall be cleared of all trees, stumps, brush, and rubbish where excavation is to be made. Loam shall be removed from the area and to such depths as the Engineer

18 Officer in charge shall direct, and shall be compactly piled for subsequent use in places to be designated.

49. Excavation.—The excavation shall then be made for the various structures to the lines, grades, and forms shown by the plans or given by the Engineer Officer in charge.

50. Where fills or embankments are to be built, the top surface of the ground shall be excavated to such depth, determined by the Engineer Officer in charge, as shall be necessary to obtain a suitable foundation for the embankment or fill.

51. In case the material encountered at the desired grade of the foundation is, at any point, unsuitable for carrying the loads to be placed upon it, the excavation shall be carried to such additional depths as the Engineer Officer in charge shall direct.

52. Unauthorized Excavation.—Excavation beyond the grades and lines given shall be refilled by the contractor at his own expense, with such materials and in such manner as the Engineer Officer in charge shall direct.

53. Disposal of Excavated Material.—All materials suitable for use for puddle, or the requisite amount thereof, shall be set aside and reserved for this purpose; and other select materials shall be reserved and used for embankments, filling, and for covering the filters. A part of the surplus material shall be deposited on the south slope of the dam and carried to such lines and slopes as the Engineer Officer in charge shall direct. All trees, bushes, and rubbish shall be cleared from the slope and adjacent ground at the foot of the dam before the material is deposited. The contractor must make all arrangements for the disposal of surplus material, and hold the United States harmless against all claims whatever relating thereto.

54. Drainage and Protection.—The contractor shall provide suitable drainage, and shall remove all water promptly from all excavations, and keep them dry. He shall protect the sides of excavations, if necessary, by suitable sheeting and shoring against caving in, until the completion of the structures to be constructed therein.

55. Measurements.—All measurements of excavation shall be made in place, and the quantity paid for shall be that actually excavated within the limits prescribed.

56. Plant and Operation.—The bidder shall describe in full the

plant he proposes to use and give the dates on which the several parts will be put to work,—submitting the same in writing with the bids. The plant must be capable of handling at least six thousand (6,000) cubic yards per day, and must be installed promptly and worked systematically to accomplish the above results as nearly as may be. On no account shall the average rate of excavation per day for any month fall below three thousand (3,000) cubic yards.

56½. Compensation.—The compensation per cubic yard of excavation under this item shall include all labor and materials necessary for clearing, excavating, and protecting the excavation from water and from caving in, until the completion of the work to be constructed therein, and the disposal of all surplus material.

#### A. Embankment. Items Nos. 2, 3, and 4.

57. Work.—The work under this heading includes the filling of low places under filters and other structures, the filling of central courts, the embankments about the filters, and all other fills and embankments shown by the plans or directed to be made by the Engineer Officer in charge.

58. Classification.—Embankments shall be divided into three classes:

1. Embankment under filters,
2. Embankments about the walls of filters and in courts,
3. Filling over filters.

20 Material placed below the dam, in the roadways and at other low places for the purpose of disposing of it, and material disposed of off the ground shall not be paid for as embankment. When waste embankments come against the walls of filters of the pure water reservoir the usual section shall be built and paid for as embankment and all material outside shall be treated as waste.

59. Embankment under Filters. Item 2.—The ground shall be carefully cleared and soft material excavated before the commencement of the fill. The contractor shall also remove so much of the loose fill previously made as the Engineer Officer in charge shall deem as not sufficiently compact to carry the load to be placed upon it without settlement and shall order removed. Material removed shall be paid for as excavation.

60. In addition to the preparation of the surface of the ground to be covered by filling or embankment, as described under "Excavation," it shall, after the removal of loam and top soil, be furrowed or picked up to make a bond with the filling or embankment, and on sloping ground shall be stepped as directed by the Engineer Officer in charge.

61. The fill shall be composed of the most suitable materials found in excavation, preferably clay and gravel mixed, placed in three-inch layers and rolled with a grooved roller weighing at least ten tons and passing over each part of each layer at least six times and as many more times as may be necessary to thoroughly compact and solidify the material. The filling material shall not be placed or rolled when too wet to allow proper solidification and roll-

ing, and if too dry it shall be moistened by sprinkling with water, which sprinkling shall be done with water supplied by the contractor in such manner and quantity as the Engineer Officer in charge shall direct.

21 62. Embankment under filters shall be carried to a height of about six inches above the proposed foundation of the filters, or to such other height as the Engineer Officer in charge shall order, and shall be allowed to stand as long as possible before the construction of the filters, and just prior to the construction of filters it shall be graded precisely to the required level. The material found by measurement above the foundation level at this time shall be paid for both as embankment and as excavation.

63. Embankments About Walls of Filters and in Courts. Item 3.—These embankments shall be made as embankments under filters, except that materials may be taken as they come in excavation without selection, except that soil or any manifestly unsuitable material shall be excluded, and may be placed in six-inch layers instead of three-inch layers, and the finished surface shall be left as nearly as possible at the desired grade, which in the embankment about the filters shall be approximately level with the springing line, and under courts shall be the required grade for the foundation of the pavement. Exposed surfaces shall be covered with soil and smoothed to the required surfaces.

64. Filling Over Top. Item 4.—The filling over the top of the filters shall be of material obtained in excavation and shall not be rolled. The surface soil obtained in excavation shall be kept separate, and shall form the upper part of this fill in such depth as the amount of soil obtained from the whole excavation permits, not exceeding six inches. The rest of the filling over the top shall be of such materials as are obtained in excavation taken as they come. The surface shall be finished smooth and sodded and seeded as elsewhere provided.

65. Measurement and Compensation.—The compensation per cubic yard for filling and embankment shall include all labor, materials, and tools required to perform the work, and the amount of same shall be computed on the gross amount within the prescribed lines, including loam and soil covering, measured in place after settling for three months, and as much longer as time permits before the preparation of the final estimate, but with deductions for spaces occupied by puddle or other material separately paid for.

#### A. Puddle. Item No. 5.

66. Puddle of prescribed thickness shall be used on such portion of the bottom and sides of the filter-beds and the clear water basin and elsewhere as the Engineer Officer in charge shall direct.

67. Material.—The puddle shall consist of mixture of equal parts of plastic clay and sandy gravel. The clay shall be of good quality, free from loam, mica, or other foreign matter, and shall otherwise be satisfactory. Extensive beds of good clay for puddle are found in the immediate vicinity of the work and will probably occur in the excavation, but the Engineer Officer in charge shall determine

whether clay from excavation shall be used and to what extent. The sandy gravel shall consist of the best materials of this class found in the excavation, from which stones more than two inches in diameter shall have been removed, and it shall be free from all perishable matter.

68. Mixing and Placing.—The clay shall be broken fine and mixed wet with the sandy gravel in a pug mill, or other approved machinery, to the satisfaction of the Engineer Officer in charge. It shall then be placed in layers, not exceeding six inches, and thoroughly compacted. The amount and manner of wetting, and of ramming or rolling, shall be subject to the directions given from time to time by the Engineer Officer in charge, to secure  
23 watertight work. The finished surface of puddle shall be protected and kept in good order until the permanent covering is placed.

69. Quantity.—The amount of puddle which will be required can not be definitely stated, as it will largely depend on the nature of foundation encountered and other unknown factors, but bids shall be made on the basis of two thousand cubic yards, which amount may be increased or diminished to an extent considered necessary by the Engineer Officer in charge.

70. Compensation and Measurement.—The compensation per cubic yard for puddle shall include all labor, materials and tools required for preparing and placing, and the amount of puddle shall be computed in place, within the lines given.

#### A. Seeding. Item 6.

71. Work.—After the embankments and fills have been graded and the top soil trimmed to the required lines, the surfaces shall be seeded by the contractor.

72. Seeding.—The surfaces to be seeded shall be carefully prepared and raked over, and then seeded with a mixture of good grass seed, Hungarian rye, and clover seed, together with a sufficient amount of good fertilizer, not less than six hundred (600) pounds to the acre, and all well rolled.

73. Lines and Grades.—Care shall be taken to have all surfaces conform to the lines and grades given. Any sliding or settling which may occur shall be repaired by the contractor at his expense.

74. Maintenance.—The seeded areas shall be well watered as often as shall be necessary until the grass has become well rooted and in a healthy condition. All seeded areas shall be carefully looked after and cared for by the contractor, and be turned over in good condition on the final acceptance of the work.

24 75. Compensation and Measurement.—The compensation per acre shall include all materials, tools, and labor necessary for finishing, placing, and maintaining all seeded areas as specified. Measurement of seeded areas shall be according to lines given by the Engineer Officer in charge.

## A. Sodding. Item 7.

76. Work.—The contractor shall furnish and place good grass sod on top of the loam or top soil, at the edges of embankments, and at other places shown on the plans or designated by the Engineer Officer in charge.

77. Materials.—The sod shall be of good quality of earth, covered with heavy grass, sound, healthy, at least one (1) foot square and two (2) inches thick, and free from weeds. They shall be cut with a bevel on the sides, so that they will lap at the edges.

78. Placing.—The surface of the top soil shall be dampened immediately previous to laying the sod. The sods shall be properly and carefully set so as to have a full bearing on their whole lower surfaces. They shall be padded down firmly with a spade or wooden bat, and pinned if necessary.

79. Grades and Maintenance.—All details as to lines, grades, care and maintenance of sodded surfaces shall be as specified under "Seeding."

80. Compensation and Measurement.—Compensation per square yard for sodding shall include all labor, tools, and materials necessary for furnishing and placing sod, and maintaining all sodded areas. Measurement of sodded areas shall be according to lines given by the Engineer Officer in charge.

## B. Concrete. Items 8, 9, 10, and 11.

25 81. Composition of Concrete.—The concrete shall be made of Portland cement, to be furnished by the United States, and sand and gravel or broken stone, or both, to be furnished by the contractor.

82. Sand.—The sand used for concrete and mortar in all parts of the work shall be sharp, sufficiently coarse, clean, free from mud, sewage, clay, paper, leaves, chips, and other foreign matter, and shall not have more than three per cent by weight of loam and silt.

83. Ballast.—The ballast for concrete shall consist of clean gravel stone, or fragments of hard, durable stone, broken to such sizes that all will pass through a 2½-inch ring and from which all particles smaller than ¼ inch shall have been screened out. A mixture of gravel and broken stone may be used. Material shall be graded from fine to coarse, and that which is all of one size shall not be used.

84. Ballast shall be free from dust, loam, clay, ashes, coal, perishable matter or other improper substances. It shall be washed or screened, or both, if necessary to remove such substances.

85. Samples.—Samples of sand and ballast which the contractor proposes to use shall be submitted to the Engineer Officer in charge for examination at least two weeks before the contractor commences to deliver the material upon the ground. Materials shall not be delivered until the samples have been approved by the Engineer Officer in charge, and, as delivered, shall be in all respects equal to the samples submitted and approved.

86. Storehouse.—The Contractor shall provide a suitable house or houses near the concrete mixer or mixers, into which the cement

shall be delivered by the United States. The house or houses shall have a floor space of at least 4,000 square feet and shall be sufficiently large so that different lots of cement can be kept separate and readily accessible, and no cement shall be used that has not been in the store-house at least two weeks. The floor shall be raised

26      above the ground so as to keep the cement dry and the sides and roof shall be sufficiently tight to protect the cement from rain or injurious effects of the elements.

87. Responsibility for Cement.—The contractor shall be responsible for the cement from the time it is delivered at the store-house, and the United States will furnish a store keeper who shall keep a record of cement received and removed and of the use made of all cement removed. The United States will furnish all the cement necessary for the prosecution of the work, but in case cement is unnecessarily used or wasted by the contractor, or damaged while on his hands, it shall be charged to the contractor at cost, and the amount of such unnecessarily used or wasted or damaged cement shall be deducted from the amount payable to him under this contract.

88. Unnecessary use and Waste.—The amount of cement unnecessarily used or wasted and damaged shall be computed as follows:

89. Deduction for Excess.—If any concrete structures are built larger than ordered, so that in the aggregate the volume of concrete in any part of the work exceeds that contained within the lines given, by more than 5 per cent, the Engineer Officer in charge shall make an estimate of the amount of cement contained in the concrete in excess of the volume contained within the lines given for the work or that part thereof built larger than ordered, and shall charge it to the contractor; but otherwise no deduction shall be made for cement used in masonry built larger than ordered.

90. Cement Charged to Contractor.—The contractor shall further be charged with the cement required for making concrete to replace any and all concrete rejected, removed and replaced with new concrete under these specifications. The contractor shall also be charged with all cement in concrete abandoned before being placed, when

27      work is stopped at noon or at night, or on account of rain or otherwise; with cement in concrete spoiled or lost, in mixing and in transmission; with cement spoiled or wasted in transit from the storehouse to the work or on the work, and cement spilled or spoiled in the storehouse for any reason whatever, and for all losses of cement of every description in connection with the work; provided, however, that if the work is handled with due care to prevent such waste and loss, and if all such losses in the aggregate amount to two per cent or less of the gross amount of cement used under these specifications, no deduction shall be made therefor.

91. Bags.—The cement will be delivered to the contractor in duck bags. The contractor shall preserve these bags in good order, shall pack them in packages containing a definite number, and shall return them in good order to the cement storehouse, and pay for any shortage in same.

92. Proportions.—In general, the proportions of the several materials used in making the concrete shall be:



1 barrel of Portland cement, weighing 380 pounds, net.

11 cubic feet of sand, loosely packed in boxes before mixing.

19 cubic feet of ballast, similarly measured.

The proportions of mixing may be varied by the Engineer Officer in charge, as may seem best for the requirements of each particular part of the work, but no change in the proportions of mixing shall be made which renders it more difficult to secure concrete of the density and quality herein specified.

93. Mixing.—The concrete shall be mixed in mixers of approved form, in which the materials shall be mixed in batches. The cement, sand and ballast for one batch of concrete shall be assembled in suitable measuring boxes so that the proportions can be readily checked by the Engineer Officer in charge before being placed in the mixer.

28 94. Water.—A water tank with suitable scale and overflow shall be provided, so that the amount of water used in each batch can be accurately measured and controlled. Water shall be added in such quantity as the Engineer Officer in charge shall order and the mixing shall be thorough and shall be continued until every particle of ballast is covered with the mortar of cement and sand.

96. Transportation to Work.—Provision shall be made for rapid transportation, from the mixer to the work so that the concrete shall be in place before the initial set commences. No retempering shall be allowed under any conditions, and all dead mortar or concrete shall be discarded and removed from the work.

96. Depositing Concrete.—The concrete shall be deposited in such a manner and in layers of such thickness as the Engineer Officer in charge shall direct, and shall be immediately rammed. The ramming shall be as thorough as is secured by pneumatic rammers.

97. Ramming.—The operation of ramming shall be so conducted as to give a thoroughly compacted, dense, impervious, artificial stone of high specific gravity. When a deficiency of moisture is indicated during ramming, it shall be supplied by sprinkling with a fine spray of water.

98. Old and New Work.—In joining new work to old such precautions as shall be satisfactory to the Engineer Officer in charge shall be taken to secure perfect bonding at all points.

99. Bonding Joints.—Grooves shall be placed at bonding joints where called for by the plans and where ordered by the Engineer Officer in charge. All such grooves in old work shall be thoroughly cleaned and wet before placing new concrete.

29 100. Care of Exposed Surfaces.—All exposed surfaces of finished and unfinished work shall be kept constantly moist by covering or by sprinkling at short intervals, or both, and this covering or sprinkling shall be continued until the permanent covering, filling or backing material is in place. The tops of walls and other surfaces permanently exposed shall be kept moist for such period, not exceeding two weeks, as the Engineer Officer in charge shall require.

101. Walking on Concrete.—The contractor shall not permit walking or working over or upon the concrete until it has set for a

sufficient length of time, to be determined by the Engineer Officer in charge.

102. Forms and Centers.—The contractor shall erect all forms and centers required for the work. They shall be smooth, free from all holes, true to the line, strong, and braced to stand without movement until the concrete has set. Should the forms or centers lose their proper shapes and dimensions, or should the surfaces become roughened or dented, they shall be removed from the work; and only forms and centers conforming to the specifications, clean and free from cement or dirt, shall be used in the work.

103. Size of Forms.—The forms shall be of such size that they can be moved forward readily. Small rods to hold the forms will be allowed in the walls, and all holes left after removing these rods shall be completely filled with cement mortar.

104. Measuring Concrete.—The concrete shall be measured within the lines shown by the plans, or given by the Engineer Officer in charge. No allowance shall be made for building structures thicker, deeper or larger than ordered, and the price paid shall be compensation for all labor, materials, tools, machinery mixers and cement storehouse, but not the cement.

105. Concrete in Floors.—The floors shall be made in the form of inverted groined arches and shall be constructed in general  
30 in alternate diagonal square sections, of such form that they can be screeded with straight screeds to the dimensions of the containing forms. The side of the squares shall be about 9.9 feet for filters 1 to 24 inclusive; 9.65 feet for filters 25 to 29 inclusive, and 12.7 feet for pure water reservoir. The second set of blocks shall be placed after the forms for the first are removed and shall be similarly screeded to the concrete blocks already in place. The forms shall be set truly to the lines and grades so that the piers may be set precisely at the required places, and so as to form a floor of the required thickness and level or of the required slope on the bottom.

106. Trimming Earth.—The earth below the floor shall be accurately trimmed to the required elevation after the forms are placed and before the concrete is placed.

107. Mixing Concrete.—The concrete shall be mixed wet enough so that the surface can be trowelled smooth before it sets and without the application of mortar. The trowelling shall be thorough, leaving a smooth hard surface.

108. Floors of Filters.—The floor of each filter shall be thoroughly cleaned after the completion of the overhead vaulting and the removal of the centers, preparatory to placing the filtering materials, and any cracks or other defects which may then be apparent shall be repaired by the contractor to the satisfaction of the Engineer Officer in charge.

109. Concrete in Walls.—The filter walls shall be made in sections not exceeding thirty feet in length, and if practicable each section shall be made monolithic. In case it is found necessary to make horizontal joints in any section of wall, a deep groove shall



be made in the temporary top by driving a wooden wedge into it before the concrete is set.

110. Joining Sections.—The several sections of the walls shall be jointed by vertical abutting faces having a thick concrete tongue and groove running vertically the entire height of the faces. No joint shall be made at the corner of filters, but all corners shall be made monolithic with a leg extending in each direction. The exposed surfaces of walls shall be smooth and entirely free from rough and porous places, and the concrete shall be so mixed and placed as to secure this result without pointing or washing afterward. In case any block proves to be porous, rough or defective, in any way, the Engineer Officer in charge may direct such block cut out and replaced with concrete free from such defects:

111. Walls Pure Water Reservoir.—The concrete walls of the pure water reservoir, where the height does not exceed ten feet, shall be built as filter walls. Where the height is greater than ten feet they shall not be made in blocks, but in joining new work to old deep grooves shall be used, the joints shall be stepped, and the horizontal joints shall be at least four times as long as the vertical joints.

112. Walls Regulator Houses.—The walls of the regulator houses shall be built monolithic, and all cross walls in them shall be made entirely watertight.

113. Parapet Wall.—The concrete in the parapet wall shall conform in general to the specifications for concrete in filter walls, but the forms for the front or exposed face shall be faced with sheet steel or other non-absorbent metal surface and concrete shall be so placed and mixed as to present a perfectly smooth face free from roughness or voids. The top of the parapet wall shall be finished with a layer of mortar one inch thick, composed of one part of Portland cement and  $1\frac{1}{2}$  parts of sand, placed before the concrete has set and trowelled smooth, and shall afterwards be cut into lengths and have a pattern stamped upon it with a suitable roller, as in sidewalk work. At the option of the Engineer Officer in charge, the forms for the face of the wall shall have mouldings at regular intervals, dividing the face of the wall into blocks, but in this event, the sheet metal will not be required, and the surface can be left slightly irregular, but it must be entirely free from voids and from the appearance of stone.

114. Concrete in Piers.—The general requirement for concrete in piers shall be the same as for concrete in walls. Each pier shall be made monolithic and shall present smooth, uniform surfaces at all points, and shall be removed and replaced with another pier if any defect is found in it.

115. Concrete in Vaulting.—The concrete vaulting shall be placed in the form of groined arches, as shown on the plans, and the concrete shall be so mixed and rammed and trowelled on top as to present a smooth and finished appearance, both above and below. Should slight voids appear after removing the centers they shall be pointed with cement mortar as directed by the Engineer Officer in charge, but work defective to a material extent shall be removed and replaced with satisfactory work.

116. Centers for Concrete.—For supporting the concrete suitable centers shall be provided which shall be firm enough to allow thorough ramming, and shall be smooth and prepared or covered in a manner satisfactory to the Engineer Officer in charge, to allow them to be readily removed and to leave the concrete with a smooth and presentable surface. A sufficient number of centers of each class shall be provided to cover at least 15 per cent of the total area to be covered by centers of that class, and a greater number shall be provided for any part if it shall be found necessary to support the work in safety when making the specified rate of progress. The centers

may be moved forward and used again under regulations  
33 to be established by the Engineer Officer in charge. No center shall be used that is not clean and of proper shape and strength and in every way suitable. Deformed, broken or defective centers shall be repaired or removed from the work.

117. Striking Centers.—No centers shall be struck without the express consent of the Engineer Officer in charge, and subject to such conditions as will secure the safety of the work, nor until the adjacent walls are completely secured. Outside walls shall be considered as secured when the embankments against them have been completed to the satisfaction of the Engineer Officer in charge. Cross walls shall be considered as secured when the concrete vaulting on the other side of the cross wall for at least two sections is in position and set, whether supported by centers or not.

118. Ventilator Shafts.—The ventilator shafts shall be constructed of concrete, and suitable forms shall be provided for making them, which forms, if in suitable condition, may be taken away and used in other places as soon as the concrete is sufficiently set.

119. Joints in Vaulting.—All joints in the concrete vaulting shall be made on lines midway between the piers and at no other points. Strong and suitable planks shall be provided and braced for this purpose. Division joints shall be made on all the lines midway between the piers or on so many of them as may be required by the Engineer Officer in charge.

120. Removing Centers.—The contractor will be allowed to move the centering from a part of the filter before all the vaulting for the filter is completed, provided the design of the centering is such that the removed centering can be carried out without disturbing the centering remaining in place, and in no event shall less than  
34 three rows of completed vaulting in which the concrete has set intervene between the edge of the completed work and the area from which the centers are removed.

121. Centers for Vaulting.—The attention of the contractor is called to the fact that the centers for the vaulting for filters 1 to 24 inclusive are all of the same dimensions. Some special centers will be required for diagonal vaulting where the outside walls are not on rectangular lines. All special centers of this character can be used several times, the positions for which the centers are identical being indicated on the plans by the same letter. The vaulting for filters 25 to 29 has a slightly shorter span. The vaulting in the clear water reservoir has a greater span. Cylindrical centering will be required

near all walls and in the sand runs and special centering for all minor parts shown by the plans.

B. Granolithic Paving. Item 12.

122. Work.—The contractor shall lay granolithic paving in the courts and to form walks elsewhere about the plant as may be required. The granolithic paving shall not be laid until all pipes and structures beneath the surface of the courts have been placed and the trenches backfilled and solidified. The foundation shall be graded to a level five inches below the level of the surface of the finished pavement. Excavation will be paid for to this level, and where embankments occur in courts, the embankment shall be paid for to this level, so that if the work of excavation and embankment is perfectly done no grading will be necessary for the granolithic paving. The contractor shall, however, perform any final leveling which may be necessary to bring the surface precisely to grade, and no separate or additional payment shall be allowed therefor. The contractor shall thoroughly compact the bed by rolling or ramming before placing the paving.

35 123. Concrete and Mortar.—On the bed thus prepared shall be laid four inches of cement concrete and one inch of cement mortar covered by a thin, dry surface coat, all made of materials and in the manner hereinafter described.

124. Cement.—The cement will be furnished by the United States, and the same conditions will apply to it as to the cement furnished for concrete. One barrel, shall, in all cases, be taken in computing proportions of mixing as occupying a space of 3.75 cubic feet.

125. Sand.—The sand used shall be clean and sharp, from fine to coarse, free from sewage, mud, clay, mica, paper, leaves, chips and other foreign matter, but may show, when shaken with water and after subsidence, not more than three per cent by volume of silt or loam. Sand stored at the work shall, when required, be dumped on boards or other suitable platform and kept as clean as when delivered.

126. Gravel.—The gravel shall be from  $\frac{1}{4}$  inch to 2 inches in size and as good in quality as the best Potomac river washed gravel. The gravel shall be free from dust, dirt, chips, leaves and other foreign or objectionable matter, and when required shall be dumped on boards and cared for as provided for sand in the preceding paragraph.

127. Mortar.—The mortar shall be composed of the cement and sand in the proportion of one to two, by volume, thoroughly mixed dry; a sufficient quantity of water shall be added afterward by fine sprinkling to form, upon remixing, a stiff plastic paste. The proportions are intended to secure a mortar in which every particle of sand is enveloped by cement, and all voids in the gravel filled with mortar, and this result shall be obtained to the satisfaction of the Engineer Officer in charge. If the mixing be by hand, it shall be done on a watertight platform with tight raised edges, and  
36 the cement spread first. No batch shall contain more than one barrel of cement.

128. **Mixing.**—The mixing shall be done by the use of shovels, hoes and rakes until a thoroughly uniform mortar of proper consistency as above described is secured.

129. **Concrete.**—To the mortar, made as above directed, shall be added five parts by volume of the specified gravel, which shall have been thoroughly drenched with water just before it is added to the mortar. The drenching shall not be done in a barrow, nor otherwise to permit the addition of free water to the mortar. Each batch of concrete shall be thoroughly mixed until each piece of gravel is wholly coated with mortar and in a manner satisfactory to the Engineer Officer in charge. If the mixing be by hand, it shall be done on a water-tight platform with tight raised edges, and in the mixing the gravel shall be first spread over the mortar. The concrete, immediately after mixing, shall be spread upon the foundation so that the mortar shall remain evenly incorporated with gravel and then thoroughly compacted by ramming. The slab or flag divisions shall then be marked off to the size, and markings cut three inches deep and three feet apart. The space made by the cutting tool shall be immediately filled with dry sand and well rammed.

130. **Mortar for Surface Layer.**—Mortar for the surface layer shall be made of the specified cement and sand, mixed in the manner as for mortar for concrete, but in the proportion of two to three by volume. The mortar shall be spread while fresh upon the concrete base while the latter is still soft and adhesive and before it shall have reached its first set, in such quantity that after thorough manipulation it shall be 1 inch in thickness. It shall then be leveled off and beaten with wooden battens, so as to break any air cells and make the surfacing perfectly solid and at the true grade. No pavement marked by sand which has been spread over it for protection will be accepted.

131. **Slabs.**—A coating of dry cement and fine sand in equal proportions by volume and such part and kind of coloring matter as the Engineer Officer in charge may direct, thoroughly mixed, shall then be floated into the layer; and by a skilful use of tools the surface shall be made smooth and ready for the markings of the slabs; the markings will be made to the depth of  $\frac{1}{2}$  inch and immediately over those made in the concrete. The slabs shall then be brought to true lines and grades, and except at about inch margins, rolled with a toothed roller to make a surface that will not be slippery. Expansion pieces of dressed white pine 1 inch by 6 inches shall be provided where required.

132. **Connecting Layers.**—Any lack of connection between the concrete and mortar layers shall be sufficient reason for requiring entire removal and the substitution of new and satisfactory work.

133. **Protecting Pavement.**—The pavement shall be kept moist, protected against the weather and guarded against foot travel, until it has set. The contractor shall replace any block broken by settlement over trenches dug and backfilled by him, which may occur before the final acceptance of the works.

134. **Payment.**—Payment shall be made by the square yard and shall include compensation for all material and labor as specified,

except cement. No deductions will be made for openings less than one square yard in area.

B. Placing Materials in Masonry. Item 13.

135. Other Work.—In addition to the materials otherwise  
38 specifically mentioned, the contractor shall build into the masonry of the filters at the proper points in each filter other fixtures as follows:

Castings carrying the standards for gates over the inlet and waste outlet.

Three 14-ft. steel I-beams to carry sand run.

Approximately 470 fasteners for the support of electric lights.

Approximately 107 manhole frames and covers.

6-inch agricultural drain pipe in the vaulting, over the cross-wall, at intervals of about 14 feet, arranged to allow wrought-iron pipe to be put through them.

136. Delivery of Materials by United States.—The United States shall furnish all the materials except as otherwise provided. The contractor shall notify the Engineer Officer in charge, in writing, three weeks in advance of the time when materials will be required. The United States will thereafter deliver the materials at some convenient point upon the ground and will notify the contractor in writing of said delivery. The contractor shall examine the said materials as promptly as possible and shall notify the Engineer Officer in charge within three days of any shortage of material or of damaged, broken or defective material and shall be responsible for materials thereafter until the final acceptance of the work, and shall replace any material which can not be accounted for or which afterwards proves to be broken or defective.

137. Transportation by Contractor.—The contractor shall transport all materials to be placed from the point of delivery to the work and shall set and build them into the masonry in a workmanlike manner at precisely the point of elevation required, and shall surround all materials with concrete, taking particular care to have the concrete fit them accurately at every point, particularly underneath, and shall secure them to prevent any movement or  
39 floating of the pipes by the wet concrete, and shall place the manhole cover frames before the concrete has set, and shall trowel and finish with mortar all joints and connections where it may be necessary.

138. Compensation.—The price for setting this material shall be the one lump sum bid therefor per filter, which shall include all labor and materials required in connection therewith.

B. Drainage of Roof for Filters. Item 14.

139. Work.—The contractor shall furnish two-inch agricultural drain pipe, and shall build a line of such pipe into each pier in the filters, shall provide a strainer of brass wire cloth, eight inches square, made of No. 15 wire, with 4 meshes to the inch, and shall place the same over the top of each pipe. Over each strainer he shall place one



cubic foot of fine screened gravel, coarse enough so that it will not pass through the wire screen and fine enough to retain the sand placed upon it. Above and about the gravel he shall place ten cubic feet of sand like that specified for making concrete. The space over the cross-walls shall be drained by two-inch tile pipes, going through the vaulting, and spaced about 28 feet apart, and with as much two-inch pipe laid in the gutter connected with it as is used in two piers, and surrounded by gravel and sand, placed as directed, amounting to 1 cubic foot for each lineal foot of cross-wall. The contractor shall maintain these pipes open and shall dig out and open any which may prove to have been stopped up by mortar or otherwise, upon the completion of the work.

140. Compensation.—The price paid for furnishing and placing these materials shall be the one lump sum per filter bid therefor.

40 C. Steel Pipe Lines and Appurtenances. Item 15.

141. Work.—The contractor shall furnish and place steel pipe lines with all accessories as shown upon Sheet No. 13 of the contract plans.

Character of Steel in Plates and Rivets.

142. Steel.—The steel used in making plates shall be soft steel, made by the open-hearth process. For the purpose of identification, each melt of steel shall be numbered consecutively and the corresponding number shall be stamped on each sheet or plate produced therefrom. Each plate shall also have a consecutive plate number clearly stamped upon it. All such stamping shall be deep enough to be readily legible after pipe is coated.

143. Place of Manufacture.—The contractor shall notify the Engineer Officer in charge of all places where steel plates and rivets are to be made, and of the place of manufacture of the pipe, and the dates on which the various operations will be commenced.

144. Test Specimens.—The contractor shall furnish and prepare at his own expense all required test specimens, which shall be selected at random by the Engineer Officer in charge. They may be taken from twenty per cent of the plates produced from each melt, and at least two shall be taken.

145. Failures.—The failure of the test specimens to fully and satisfactorily conform to the requirements of these specifications shall be sufficient cause for the rejection of the entire melt from which the samples were obtained.

146. Steel for Plates.—The steel for plates shall not contain more than five one-hundredths of one per cent of sulphur, not more than five one-hundredths of one per cent of phosphorus, and not more than five-tenths of one per cent of manganese.

41 147. Analysis.—At least one chemical analysis shall be made from each melt of steel and the result shall be furnished to the Engineer Officer in charge.

148. Tensile Test Specimens.—Tensile test specimens shall be cut

both lengthwise and crosswise from the plates, which shall be rectangular in shape, and one and one-half inches wide, of the thickness of the plates and eight inches long between measuring points.

149. Tensile Strength.—The tensile strength of steel for plates shall be between the limits of fifty-two thousand and sixty-two thousand pounds per square inch. The elastic limit shall not be less than thirty-one thousand pounds per square inch; the elongation shall not be less than twenty-five per cent longitudinally of the plate and twenty-two per cent transversely of the plate, and there shall be a reduction of area of not less than fifty per cent at the point of fracture, which shall be silky in character.

150. Bending Test Specimens.—The bending test specimens shall be cut both lengthwise and crosswise from the plates and shall not be less than six inches long, one inch wide, and of the thickness of the plate. They shall bend cold one hundred and eighty degrees, or "double flat" when hammered, without showing the least sign of fracture, and also withstand the same test after having been heated to a dull red heat and quenched in cold water.

151. Drifting Test Specimens.—Drifting test specimens shall be three inches wide and six inches long. They shall have two holes, three-fourths of an inch in diameter, spaced two inches between centers, punched in the center line of the specimen. These holes shall then be enlarged by a drift pin while the specimen is cold, until the holes are at least twice their original diameter, without showing any signs of cracks.

152. Hammering and Scarfing.—Plates shall also be capable of enduring cold hammering or scarfing to a fine edge without cracking or showing signs of fracture.

153. Other Test Requirements.—Plates shall withstand such quenching, forging and other test requirements as shall satisfy the Engineer Officer in charge and suffice to fully exhibit the fitness of the material for the use to which it is to be put.

154. Character of Plates.—The plates shall be free from lamination, blisters and all surface defects; they shall have clean edges and a workmanlike finish throughout.

155. Rolling and Shearing.—All plates shall be rolled as flat and sheared as accurately as good mill practice will permit, but in no case shall they be scant of the prescribed dimensions, and they shall be in all respects in a good merchantable condition.

156. Thickness.—The plates shall be fully up to the required thickness at the edges, ninety-five per cent of the plates shall be of the full required thickness at all points, and any plate whose thickness at any point is less than ninety-five per cent of the required thickness shall be rejected forthwith.

157. Defects.—Any sheet or plate showing any defect during the process of manufacturing into pipes, while laying, or during any preliminary or final tests, shall be rejected and shall immediately be replaced by the contractor, notwithstanding that test pieces from the melt from which said plates were manufactured, and the plates themselves, have previously passed the specified tests and requirements.

158. Rivets.—All shop rivets shall be made of open-hearth soft steel for which the chemical and physical requirements and prescribed tests shall be the same as those of the steel plates.

159. Tests.—Rivets in addition shall withstand the following tests: They shall, when cut from a riveted plate with a cold

43 chisel, show a tough and strong condition without fracture.

160. Rivets for Field Use.—Rivets for field use may be made of the best quality of wrought-iron, if preferred by the contractor, but in such case shall conform to such requirements and tests as prescribed by and shall be entirely satisfactory to the Engineer Office- in charge.

161. Rust.—All plates and rivets shall be free from rust and shall be kept under cover from the time of manufacture, during storage and transportation and until made into the pipe and the same is dipped and loaded at the place of manufacture. In case of accidental rusting such plates and rivets shall be rejected, unless in the opinion of the Engineer Office- in charge they can be and are satisfactorily cleaned before manufacture and coating.

### C. Manufacture of Pipes.

162. Manufacture.—The plates shall be rolled while cold to true cylinders. No heating nor hammering shall be allowed for shaping or curving or for any other purpose. All parts must be adjusted to a perfect fit and properly marked.

163. Courses.—The pipe shall be made with alternate inside and outside courses and the diameter designated shall be measured as of the inside of the inside course. The lengths of the sheets may be varied within reasonable limits at the option of the contractor.

164. Edges.—The edge of each plate shall be properly planed and beveled for caulking all around, both inside and outside. At the end of each course and at the junction of the circular and longitudinal seams, the plates shall be reduced by hammering to a fine edge, through which two of the rivets of the circular seam shall be driven

44 to insure tightness. No beveling by shearing shall be done and all beveling, planing and chipping of edges shall be done before the courses are put together.

165. Laying Out Work.—The work shall be carefully and accurately laid out, all rivet holes shall be spaced with precision and shall be one-sixteenth of an inch greater in diameter than the diameter of the rivet when cold. They shall be clean cut, without torn or ragged edges, and in punching only the best and sharpest punches and dies shall be used. The Engineer Officer in charge shall have the right to order a change of punch or die whenever the holes punched are not to his satisfaction.

166. Punching.—The punch shall be applied to that side of the plate which is to be placed in contact with another plate, and all burrs or splits caused by punching shall be removed by counter-sinking.

167. Corresponding Holes.—Corresponding holes shall coincide to within one thirty-second of an inch and they may be slightly enlarged by a sharp reamer or drill if necessary to fit.



168. Drifting.—No drift pins shall be used in forcing holes except when, in the opinion of the Engineer Officer in charge, slight drifting will not materially reduce the strength of the plate; and all plates in which corresponding holes can not be made to receive the rivet of the specified diameter in this manner shall be rejected.

169. Shop Riveting.—All riveting in the shop shall be done by steam, compressed air or hydraulic machinery, exerting a slow pressure which shall be maintained until the rivet head has lost its redness. Before any rivets are driven the plates shall be perfectly clean and shall be brought in close contact by a suitably applied pressure, which shall be maintained until the rivet is driven.

170. Driving.—All rivets shall be driven hot and at such heat as to give the best possible results when driven. Any rivet  
45 that may have been driven cold or overheated, or is in any way defective, shall be cut out and replaced by the contractor by one that is acceptable. All rivets shall be perfect in form and shall, when driven, completely fill the holes and have heads of proper form and size and truly concentric with the shank of the rivet.

171. Special Rivets.—Rivets of special length shall be provided when riveting through more than two thicknesses.

172. Caulking.—The pipe shall be caulked at the shop in the best manner and by the most improved method at all seams and joints, both inside and outside, before the protecting coating is applied. All caulking shall be done by a round-nosed tool, and split caulking shall not be used.

173. Plates.—The plates shall be five-sixteenths of an inch thick and shall be riveted with three-quarter-inch rivets. Rivet holes shall be thirteen-sixteenths of an inch in diameter; the approximate pitch shall be one and nine-tenths inches and the lap at joints shall be two and three-eighths inches. All seams shall be single riveted. The pitch may be varied sufficiently to give an even number of divisions in each plate. The lap shall not vary at any point more than one-fourth of an inch in either direction.

174. Manholes.—The contractor shall furnish and put in place in a workmanlike manner all required manholes in the steel pipe, with covers, chains, yokes, gaskets, and bolts complete.

175. Castings.—The castings for the manhole covers and for any other cast-iron used under this item, shall be made of tough gray iron, which shall exhibit a uniform and close-grained fracture, free from any white, mottled or vitreous appearance, and shall be soft enough to be readily cut, drilled and chipped.

176. Hand Holes.—Hand holes, if necessary shall be provided  
46 satisfactory to the Engineer Officer in charge, and shall be properly tapped and closed by threaded plugs after the sections are connected up in the field and before the trench is backfilled.

177. Branches.—Branches leading to other steel pipe shall be made entirely of steel plates formed and riveted in a substantial and water-tight manner, conforming in all respects to the specified requirements for straight steel pipe.

178. Attaching Smaller Lines.—Smaller pipe lines of cast iron,

and all connections not otherwise specified, shall be attached by close-fitting steel castings, suitably riveted and caulked to the pipe and carrying a flange or bell to be bolted or leaded to the cast-iron pipe or gates.

179. Castings.—The castings shall be of the best quality, thoroughly annealed, free from any and all defects and imperfections and entirely satisfactory to the Engineer Officer in charge.

180. Rings.—Four rings of steel angles of the same quality, in chemical, physical and test requirements as the plates, shall be placed around the exterior of each line of steel pipe and be riveted and caulked thereto within twenty feet of the end to bind it to the concrete. Two 48-inch, two 54-inch and two 72-inch ends shall be fixed in this way.

181. Other Work.—All other special steel pieces required for the steel pipe lines, such as connections, closing pieces, reducers, increasers, branches and pieces involving any kind of boilermaker's work shall be manufactured in the most approved manner, of the best material.

182. Specials.—The angles, curves and specials shown by the contract plans are such as it is now believed will *will* be required, but if obstacles are encountered which, in the opinion of the Engineer Officer in charge, require modification of the lines or of the curves and specials, such modification shall be made by the contractor.

47 183. Shop Drawings.—The contractor shall submit to the Engineer Officer in charge copies of shop drawings, showing the details of connections and of any proposed construction not fully covered by the contract plans. Such drawings shall be submitted in duplicate, one copy to be returned to the contractor with the approval of the Engineer Officer in charge, the other to be retained by the Engineer Officer in charge.

184. Testing Sections.—After several pipe sections have been riveted together in the shop and before the protective coating has been applied, every fourth made up section shall be tested by hydraulic pressure at fifty pounds per square inch.

185. Tests by Contractor.—All such tests shall be made by the contractor, who shall supply the necessary clean water, apparatus, caps and appliances without charge.

186. Leakage.—All leakage shall be made tight under pressure by suitable caulking with the proper tools. Rivet caulking to insure tightness shall not be allowed if the rivet is loose, nor unless the leak is very slight and easily closed up. Otherwise the rivet shall be cut out in a careful manner and a new one inserted and headed up tight while hot. If the leaks are numerous and of a nature not to be well repaired, the whole section shall be rejected.

187. All Sections May be Tested.—The Engineer Officer in charge reserves the right to test all sections if the tests of every fourth section do not show the pipe to be substantially tight and to reduce the number of sections tested when all sections tested are tight.

188. Cleaning.—After the pipe shall have been tested and made perfectly water-tight, it shall be thoroughly cleaned and all moisture,

rust, dust, earth and foreign substances shall be removed from both the inside and outside.

48 189. Dipping.—The pipe shall then be immediately heated to three hundred and fifty degrees, Fahrenheit, after which it shall be coated by being dipped vertically in a bath of special pipe coating, manufactured by the Assyrian Asphalt Company of Chicago, Ill., or other material equally as good and approved by the Engineer Officer in charge. The bath shall be heated in such a manner as to insure a temperature of three hundred and fifty degrees, Fahrenheit.

190. Dipping Material.—The dipping material shall be kept free from sand, grit, or other foreign material. To obtain this result the contractor shall, as often as is necessary in the opinion of the Engineer Officer in charge, empty the tanks of their contents and refill them with clean and pure material.

191. Coating.—The protective coating shall be smooth and hard, yet tough, elastic, strongly adhesive to the metal and durable; and it shall be free from blisters and bubbles. It must not become soft enough to flow when exposed to the summer heat, nor brittle enough to crack and scale off when exposed to a temperature below freezing.

192. Imperfections.—If, after any section of pipe shall have been coated, any imperfections in the coating are found, or if for any reason it does not give satisfaction, such section or sections shall be cleaned in a thorough manner of all coating, and a new application made in a manner approved by and satisfactory to the Engineer Officer in charge.

### Transportation and Laying.

193. Protection.—During storage, transportation and laying, pipes shall be carefully protected so that the coating shall not be removed, abraded or injured in any manner. No metal wedges, levers, or pries shall be used in handling the pipe.

49 194. Damaged Pipe.—In case any pipe or special piece receives any indentation or deformation at any time, it shall be returned to the proper shape by hammering with wooden tools, then thoroughly cleaned and redipped or recoated as heretofore described; or it shall be replaced with new pipe if so ordered by the Engineer Officer in charge.

195. Laying.—The pipe shall be laid in the trench and made to bear uniformly along the whole length, and suitable blocking shall be provided to secure this, and to maintain the pipe the proper distance above the subgrade, where concrete is to be placed under the pipe.

196. Bolting.—In connecting up the pipe before riveting, a sufficient number of bolts of the proper size shall be placed in the rivet holes and drawn up, to keep the sections in line and to insure against any pulling apart or separating which would produce unfair holes.

197. Riveting.—After the pipes have been properly placed and connected they shall then be riveted up in a workmanlike manner and the joints caulked.

198. Shop and Field Riveting.—All provisions for shop riveting and caulking shall also apply, as far as practicable, to work done in the field.

199. Protection.—During the laying, riveting and caulking and while men are at work inside or about the pipe, it shall be covered inside on the lower part and also on the top outside with suitable canvas or other approved covering, which shall be stretched over portions where the men are at work.

200. Covering.—The said covering shall not be less than thirty inches wide and shall be free from holes. This covering shall remain on the outside until backfilling has reached the place. After the inside covering shall have been removed no person shall go into the pipe without wearing rubbers or rubber boots.

201. Floating and Caving.—The contractor shall take every precaution against the floating of the pipe or caving of the sides, due to water coming into the trench. In case of such flotation he shall replace the pipe at his own expense, and make wholly good any injury or damage which may have resulted to it.

202. Cleaning.—After the pipe in the trench has been riveted and caulked it shall be thoroughly cleaned inside and outside, and all abrasions and injuries to the coating shall be thoroughly repaired and all field joints coated as follows:

203. Recoating.—The pipe at all such places shall be thoroughly heated by a flame, and coating material, as hereinbefore specified, shall be applied to it at a suitable temperature. The places shall be further heated until the new coating joins and becomes thoroughly incorporated with the coating previously applied.

204. Excavations.—The contractor shall make excavations for all steel pipe, and shall maintain them from caving in, and shall use such sheeting, bracing and shoring as shall be necessary for this purpose. Where piping is laid in embankment or fill, the embankment or fill shall first be built and then a trench excavated and the pipe laid, and the trench backfilled as specified. In no case shall the trench be excavated until the embankment is at least one foot above the top of the pipe.

205. Concrete.—The contractor shall surround all steel pipe with concrete and shall build manholes as shown. The concrete shall be composed of materials as specified under concrete masonry, and shall be mixed in general in the same way, but if the pipe is placed before the contractor has his concrete mixing apparatus in operation, concrete mixed by hand, under the instructions of the Engineer Officer in charge, shall be accepted. The concrete sections shall conform in general to those shown on the plans, but the exact sections will not be rigorously insisted upon. The essential requirement is

51 that the pipe shall be entirely surrounded by concrete, that the thickness of the concrete shall, at no point, be less than six inches, and if possible that the whole space between the bottom and sides of the trench and the steel pipe shall be filled with concrete, making a perfectly solid structure resting on undisturbed material and protecting the pipe against deformation. Where the trench is made considerably wider, however, particularly at joint

holes, the contractor shall be allowed to put in substantial plank forms at a minimum distance of 9 inches from the pipe on the sides and to fill this space with concrete and to fill the spaces outside with earth, rammed hard, the forms preferably being left in place. The United States will furnish the cement for concrete, but the contractor shall supply all other materials and labor.

206. Refilling.—The contractor shall refill the trench over and around the pipes and structures to the required grade immediately after the completion of such successful examination as shall be applied and the work approved by the Engineer Officer in charge.

207. Backfilling.—The backfilling shall in all cases be done with materials obtained in excavation, placed in 6-inch layers and shall be rammed solid, using such amount of water as shall be directed, and all to be done to the satisfaction of the Engineer Officer in charge. Special care shall be exercised in backfilling about structures likely to be deformed, broken or displaced.

208. Surplus Material.—Surplus material shall be disposed of in the same manner as specified for excavation.

209. Bid for Furnishing and Laying.—The cost of excavation and refilling trenches and disposal of surplus material, and of concrete, is included in the price bid for furnishing and laying steel pipe, and no separate or additional payment shall be made therefor.

52 D. Cast-iron Pipe and Specials. Item 16.

210. Work.—The contractor shall furnish and place in position free from foreign matter and ready for use, all the cast-iron pipes, specials and appurtenances shown upon Sheets Nos. 14 and 15.

211. Character.—The cast-iron pipes and specials shall conform to the plans on the above-mentioned sheets and to the dimensions and specifications adopted by the New England Water Works Association, a copy of which is on file in the office of the Engineer Officer in charge.

212. Unused Pipe.—The United States shall own all cut and unused pipe at the completion of the work, and the contractor shall pile up neatly all such material at some point upon the grounds designated by the Engineer Officer in charge.

213. Additional Pipe.—Should additional pipe or specials be found necessary to carry out the general plans shown, it shall be furnished by the United States.

Laying.

214. Work.—Proper and suitable tools and appliances for the safe and convenient handling, conveying and laying of the pipes shall be used. Care shall be taken to prevent the coating from being damaged, particularly on the inside of the pipes.

215. Cleaning.—The pipes shall be thoroughly cleaned before being laid and shall be kept clean during the work.

216. Defects.—All pipes and special castings shall be carefully examined for defects, and no pipe or special casting shall be laid

which is known to be defective. If any such pipe or special casting shall be discovered to be defective after being laid, it shall be removed and replaced by the contractor.

53     217. Blocking.—Each length of pipe shall be laid upon blocking, placed at two different places along its length.

218. Blocking.—The blocking shall be of sound plank three inches thick, ten inches wide, and of a length equal to the diameter of the pipe. Wedges twelve inches long of four-inch by four-inch stuff shall be placed on the blocking to hold the pipe in position. The blocks shall be bedded level across the bottom of the trench, and, when any block has been sunk too deep, additional blocking shall be placed to bring the pipe to the required grade.

219. Joints.—In making joints the spigots shall be adjusted in the bells so as to give a uniform space all around, and the joints shall be made with twisted or braided hemp packing and soft pig lead. The packing shall be thoroughly driven into the bell so as to leave a space at least two inches in depth, for pipes less than twenty-four inches in diameter, and at least two and one-half inches for pipes twenty-four inches and larger in diameter.

220. Melting Pot.—The melting pot shall be kept near the joint to be poured, and dross shall not be allowed to accumulate in the pot.

221. Caulking.—The joints shall be thoroughly caulked by competent mechanics, in such a manner as to secure a tight joint without overstraining the iron of the bell.

222. Joints.—The contractor shall furnish the lead, packing and other materials for making the lead joints. He shall also furnish and place all bolts, nuts, washers and gaskets for making all flange connections, and shall cut all pipe and drill all holes that may be necessary.

223. Pipes Through Walls.—Where cast-iron pipes pass through masonry walls they shall be built into and carefully surrounded by concrete where shown, or as ordered, and lead joints shall be

54     made within thirty inches of the exterior face of the wall. The piping will be laid out, as far as possible, to bring joints within this distance, but where necessary, pipes shall be cut to make lead joints in these positions.

224. Venturi Meter.—The United States will furnish a Venturi meter, with a laying length of about 15 feet 3 inches, to go in the effluent pipe from each filter, and will furnish all gates, connected with the pipe by lead joints, and built into or surrounded by masonry, and the contractor shall excavate for, lay and connect up Venturi meters and gates with the iron pipe in a substantial and workmanlike manner. To facilitate draining the Venturi meters shall not be set until after the completion, cleaning and inspection of the corresponding central drains or filters.

225. Gates.—All gates bolted to flanges in gate chambers and in the filters will be furnished by the United States, and placing them is not included in this contract.

226. Excavations.—The contractor shall make excavations for all pipes, and shall maintain them from caving in, and shall use such



sheeting, bracing and shoring as shall be necessary for this purpose. Where piping is laid in embankment or fill, the embankment or fill shall first be built and then a trench excavated and the pipe laid, and the trench backfilled as specified. In no case shall the trench be excavated until the embankment is at least one foot above the top of the pipe.

227. Refilling.—The contractor shall refill under, around and over all pipes and structures to the required grade immediately after the completion of such satisfactory examinations as shall be applied, and the work approved by the Engineer Officer in charge.

228. Backfilling.—The backfilling in all cases shall be done with materials obtained in excavation, placed in 6-inch layers and shall be rammed solid, using such amount of water as shall be directed; and all to be done to the satisfaction of the Engineer Officer in charge. Special care shall be exercised in backfilling about structures likely to be deformed, broken or displaced.

229. Surplus Material.—Surplus material shall be disposed of in the same manner as specified for excavation.

230. Bid for Furnishing and Laying.—The cost of excavation and refilling trenches and disposal of surplus material is included in the price bid for furnishing and laying cast-iron pipe and specials, and no separate or additional payment shall be made therefor.

#### D. Sand Washing Pipe. Item 17.

231. Work.—The contractor shall furnish and lay a system of sand washing pipe, as shown on Sheets Nos. 22 and 23. All gates and hydrants under this item will be furnished by the United States. All other materials and labor shall be furnished by the contractor.

232. Character.—The cast-iron pipe and specials shall be of the quality and conform to the requirements under Item 21, except that the dimensions and thicknesses and weights shall conform to Class G of the New England Water Works Association specifications. The pipes shall be laid in the manner specified for "Cast-Iron Pipe and Specials" under Item 16.

233. Laying.—When the pipes are placed in embankment, they shall be laid in a ditch which shall be dug after the embankment is at least eighteen inches above the center of the pipe line.

234. Backfilling.—Backfilling shall be done as specified under Item 15.

235. Fasteners.—Strong and suitable fasteners or hangers shall be attached to the sides of the filter walls, for the purpose of supporting the pipes attached to them.

236. Supply Lines.—The supply lines and the ejector lines from the points just inside the filter walls shall be of standard wrought-iron pipe as shown upon Sheets Nos. 22 and 23. It shall be thoroughly coated inside and out, as well as all fittings, with a suitable asphalt coating approved by the Engineer Officer in charge.

237. Connections.—At intervals on each line there shall be standard male connections for 2½ inch hose and controlled by a gate.

On the cross-walls one-half of these connections shall have outlets on the opposite side of the wall, and the pipe connections shall pass through the 6-inch openings provided therefor under Item 22. The contractor shall furnish the flanges to connect the wrought-iron pipe to the cast-iron pipe, and all couplings, tees, bends, and specials of every description to complete the system as shown.

238. Test.—The whole system shall be tested with one hundred and twenty-five pounds pressure per square inch and made watertight at this pressure. All materials for testing shall be furnished by the contractor at his own expense.

239. Unused Materials.—The United States shall own all unused materials and the contractor shall deliver them at some convenient point upon the grounds designated by the Engineer Officer in charge. Should pipe or specials be required to finish the system in addition to those shown by the schedule on Sheet No. 22 they shall be furnished by the United States.

240. Compensation.—The compensation for this work shall be the one lump sum bid therefor, which shall include excavation and backfilling and all labor and materials, except gates and hydrants, as shown upon Sheets Nos. 22 and 23.

#### D. Pressure Pipe Systems. Item 18.

241. Work.—The contractor shall place in the wall of each filter one brass tube with strainer connections, as shown upon Sheet No.

20. He shall connect the same with lead lined pipe or its  
57 equivalent, of three-fourths of an inch in diameter, and shall lay a line of such pipe to a place inside the regulator house, corresponding to that filter.

242. Laying  $\frac{3}{4}$ -inch Pipe.—The contractor shall also lay  $\frac{3}{4}$ -inch pipes of the kind above described, connecting one with the throat and with one end of each Venturi meter and going therefrom to points inside the corresponding regulator house.

243. Pressure Pipes.—All pressure pipes shall be laid on a regular ascending or descending grade, at least four feet below the court level and at the elevation necessary to serve its purpose.

244. When placed in embankment they shall be laid in a ditch which shall be dug after the embankment is carried to a point at least one foot above the pipe. The backfilling shall be done as specified under Item 15.

245. Material.—All pipe and material required for this work will be furnished by the United States.

246. Compensation.—The compensation for the system of pressure indicator pipes shall be the one lump sum bid therefor and shall include all labor and tools for doing the work as above specified. It shall also include compensation for all necessary excavation and backfilling.

#### E. Exterior Drains and Manholes. Item 19.

247. Work.—The contractor shall furnish and lay all exterior drains, manholes and catch basins shown upon Sheet No. 16 with manhole details as shown on Sheet No. 11.



248. Materials.—The United States will furnish manhole covers, inlet castings, iron ladders and the sluice gates in the outlet manholes and the cement for making the joints and laying the brickwork or making the concrete in the manholes. The contractor shall furnish all other materials.

249. Quality.—All pipe shall be of the best quality, sound, 58 hard burned, salt glazed vitrified clay, with surfaces smooth, hard and even, of uniform texture, free from blisters, cracks, flaws and any imperfections, and acceptable to the Engineer Officer in charge in every respect. The pipe shall be true in shape and form, and of full diameter throughout, and either straight or of the required curvature.

250. Size of Bells.—The bells shall be of the standard depths, and large enough to receive to their full depth all spigot ends without chipping and to leave a space of not less than one-fourth of an inch around for the cement.

251. Inspection and Tests.—All pipes and specials shall be subject to such inspection and tests on delivery as the Engineer Officer in charge shall require, and shall be subject to his approval or rejection, and all rejected or damaged pieces shall be broken and removed immediately from the work and replaced by such as are acceptable to the Engineer Officer in charge.

252. Joints.—The joints shall be made as follows: A gasket of oakum thoroughly saturated with neat Portland cement shall be carefully coiled and pressed into the joint around the entire circumference of the pipe. No joint shall be cemented until the gasket of the next joint in advance has been completed.

253. Mortar.—Portland cement mortar, composed of one part of cement and two parts of sand, each of the quality specified for "Concrete," shall be pressed into the space between the socket and the spigot so as to fill it entirely. The bevel of the joint at the end of the socket shall be carefully and evenly made.

254. Excavation.—The excavation made for the socket of the pipe shall be filled with sand to support the pipe firmly in position. When a joint is completed great care shall be taken not to disturb it before refilling.

255. Branches.—Branches shall be provided and placed 50 at all points shown by the plans or necessary for the completeness of the work, as directed by the Engineer Officer in charge.

256. Drains.—All drains shall be cleaned and kept free from all dirt, cement, superfluous materials and obstructions as the work proceeds, and the contractor shall finally make good all defects before the acceptance of the work.

257. Manholes.—The contractor shall construct all manholes on the lines of the drains shown by the plans. The manholes and chambers shall conform in size, form, thickness of walls and dimensions of details, as shown on Sheet No. 11. The side walls shall be of brick and the bottoms of concrete, all of which are included in the one lump sum bid.

258. Ladders and Frames.—The United States will furnish lad-

ders and frames with covers, and inlet castings as shown on the plans, and the contractor shall set and securely fasten them to or into the masonry as required.

259. Excavations.—The contractor shall make the excavations for all drains, and shall maintain them from caving in, and shall use such sheeting, bracing and shoring as shall be necessary for this purpose. Where piping is laid in embankment or fill, the embankment or fill shall first be built and then a trench excavated and the pipe laid, and the trench backfilled as specified. In no case shall the trench be excavated until the embankment is at least one foot above the top of the pipe.

260. Refilling.—The contractor shall refill, under, around and over all pipes and structures to the required grade immediately after the completion of such satisfactory examination as shall be applied and the work approved by the Engineer Officer in charge.

261. Backfilling.—The backfilling shall in all cases be done with materials obtained in excavation, placed in six-inch layers  
60 and shall be rammed solid, using such amount of water as shall be directed: and all to be done to the satisfaction of the Engineer Officer in charge. Special care shall be exercised in backfilling about structures likely to be deformed, broken or displaced. Pipes found broken before the final acceptance of the work shall be replaced by the contractor.

262. Surplus Material.—Surplus material shall be disposed of in the same manner as specified for excavation.

263. Compensation.—The cost of excavation and refilling, trenches and disposal of surplus material is included in the price bid for furnishing and laying exterior drains and manholes, and no separate or additional payment shall be made therefor.

#### F. Main Filter Underdrains. Item 20.

264. Work.—The contractor shall place the central underdrain in each filter as shown by the plans. The necessary excavation shall be paid for by the cubic yard under the item therefor. The vitrified pipe and branches shall conform to the specifications for pipe under Item No. 19. The pipe shall be selected in such lengths that the center of each branch shall come within 6 inches of the point designated for it, which points are, in general, 14 feet apart. This can be accomplished by using pipes of different lengths, and the pipes shall be selected in lengths to accomplish this purpose.

265. Joints.—All joints shall be made watertight by first using a small jute gasket thoroughly saturated with neat Portland cement, carefully coiled and placed in the bell of the pipe. The joints shall then be made of Portland cement mortar of one part of cement and one part of clean, sharp sand. The mortar after being pressed into the joint by hand shall present a beveled surface, the outer edge of  
61 which shall be flush with the bell of the pipe. The joints shall be carefully and thoroughly swabbed as soon as made.

The open ends of the pipe already laid and all branches shall be protected so that no dirt or other obstructing material can enter the same.

266. Laying Pipe.—The pipe shall be supported and shall be carefully surrounded by concrete without floating or moving it. The concrete shall be paid for as concrete in floors. The concrete shall be brought flush with the top of the pipe, but shall not entirely cover it. The contractor shall provide suitable and substantial closing blocks for all openings to prevent the admission of foreign matter during the subsequent operations, and shall maintain them in place until after the completion and cleaning of the masonry of the filter and the removing of the centers for the vaulting. The contractor shall then cause the drain to be inspected and cleaned, and shall remove all foreign matter then found in it.

267. Payment.—Payment for laying main underdrains shall be at a price per foot, and shall include compensation for all labor and materials required therefor, except that cement shall be furnished by the United States.

#### F. Interior Drainage System with Open Joints. Item 21.

268. Work.—The contractor shall provide and place salt-glazed vitrified pipe on the floor of each filter to form the underdrainage system.

The kinds of pipe required are:

Split 15-inch pipe without bells, in 2½-foot lengths.

Split 12-inch pipe, with bells, in 2-foot lengths.

6-inch pipe with bells cut away, in 2-foot lengths.

6-inch pipe with bells cut away, in 1-foot lengths.

Plugs for closing ends of 6-inch pipe.

6-inch quarter bends.

6-inch tees.

Special increasers.

62 269. Pipe.—The vitrified pipe shall conform to the specifications for vitrified pipe under Item 19.

270. Plugs.—For the plugs at the ends of the lines plugs may be used leaving annular spaces for the admission of water, or three bricks may be used, the object being to prevent the admission of gravel but to admit water from the gravel.

271. Special Increasers.—The special increasers may be made of vitrified pipe or of artificial stone equal to the sample exhibited in the office of the Engineer Officer in charge.

272. Pipes.—The number of pieces of pipe of each kind is shown in a table on Sheet No. 18. No pipe shall be cut, but all ends and changes in kind of pipe shall be at the nearest even length and the point shown.

273. Placing.—All pipe shall be placed with open joints and about three-fourths of an inch shall be left between the barrels of each two pipes for the admission of water. They shall be placed on the concrete floors of the filters and surrounded by gravel paid for under Item No. 22.

274. Compensation.—The price bid for interior drainage systems with open joint per filter includes furnishing and laying pipe, plugs, curved lengths, increasers and all other specials as listed, and

maintaining them in their proper positions clean and free from foreign matter until surrounded and covered by gravel.

#### G. Filter Gravel. Item 22.

275. Work.—On the floor of the filters and surrounding the underdrains shall be placed gravel or broken stone having a maximum depth of 1 foot. Instructions will be given by the Engineer Officer in charge as to the exact arrangement and positions of the various layers when the stone commences to be received upon the ground, but the arrangement will be approximately as follows: The lower 7 inches shall consist of broken stone or gravel which will remain upon a screen with a mesh of 1 inch, and which has but very few stones over 2 inches in diameter. Above this shall be placed  $2\frac{1}{2}$  inches of broken stone or gravel which has passed a screen with a mesh of 1 inch, and which remains upon a screen with a clear mesh of  $\frac{3}{8}$ -inch, and above this shall be placed  $2\frac{1}{2}$  inches of broken stone or gravel which has passed a screen with a mesh of  $\frac{3}{4}$ -inch, and which is coarser than the ordinary sand, and entirely free from fine material. The exact depths of the various layers and the meshes of the various screens may be varied somewhat, and the contractor will be allowed to make such reasonable changes as will allow the material to be handled economically and to the best advantage; but before making any changes he shall consult with the Engineer Officer in charge, and no change shall be allowed which will in any way interfere with the efficiency of the filter.

276. Gravel.—Gravel shall not be placed within 6 feet of the inlet chambers, nor within 2 feet of the outside or cross-walls, these spaces being reserved for filling with sand.

277. In case the gravel used for the lower layers should contain any material so fine that the pieces might enter the joints of the drain pipe, the Engineer Officer in charge may order coarser material to be selected from the gravel or broken stone and to be placed about the joints, the quantity of such material not to exceed 1 cubic foot per joint.

278. Material.—The material for all of the layers may be broken trap rock or granite screened to the proper sizes, or gravel screened from sand and gravel banks of a sandy nature. Gravel screened from hard-pan or clayey material can not be sufficiently cleaned.

64 The gravel shall not contain more than a very small amount of shale or limestone. The gravel shall be washed entirely free from fine material so that water passing through it or agitated in contact with it will remain substantially clean. No dirt or foreign matter of any kind shall be allowed to enter the filters after beginning to place the gravel, and any gravel made dirty in any way after placing shall be at once removed and replaced to the satisfaction of the Engineer Officer in charge.

279. Compensation.—The price bid per cubic yard for filter gravel includes the screening, washing and placing of all the different grades above enumerated, no deduction being made for the space occupied by the underdrains.

## G. Filter Sand in Place. Item 23.

280. Character.—The filter sand shall be clean river, beach or bank sand, with either sharp or rounded grains. It shall be entirely free from clay, dust or organic impurities, and shall, if necessary, be washed to remove such materials from it. The grains shall, all of them, be of hard material which will not disintegrate and shall be of the following diameters: Not more than one-half of one per cent by weight shall be less than thirteen-hundredths of a millimeter; not more than eight per cent less than twenty-six hundredths of a millimeter. At least seven percent by weight shall be less than thirty-four hundredths of a millimeter, at least seventy per cent less than eight-three hundredths, and at least ninety per cent less than two and one-tenth millimeters. No particle shall be more than five millimeters in diameter, and the sand shall be passed through screens or sieves of such mesh as to stop all such particles, and no screen or sieve shall be used containing at any point holes or passages allowing grains larger than the above to pass. The diam-

65 eters of the sand grains will be computed as the diameters of spheres of equal volume. The sand shall not contain more than two per cent by weight of lime and magnesia taken together and calculated as carbonates. In all other respects the sand shall be of a quality satisfactory to the Engineer Officer in charge.

281. Foreign Material.—The contractor shall take adequate precaution to prevent foreign or polluting material from becoming mixed with the sand, and shall protect the sand from such material until the final acceptance of the work or until the filters are put in operation.

282. Samples.—Samples of sand fulfilling the above requirements may be seen in the office of the Engineer Officer in charge, and he will examine samples of sand submitted by intending bidders and advise them whether or not they are suitable.

283. Placing.—The filter sand shall be placed in the filters in three layers, each layer to be about one foot thick, and the sand shall not be dropped from a height into final position or otherwise unduly compacted. The two first layers may be filled in to only approximate depths and the surfaces need not be smoothed. The final layer shall be brought to a true and even grade, and the surface left smooth and uniform, and such allowance shall be made for settlement as the Engineer Officer in charge may direct. The depth of sand in different filters will be varied somewhat to facilitate refilling with washed sand after the plant is put in operation.

284. Compensation.—The price bid per cubic yard for filter sand includes securing, transporting and placing the sand, together with all screening, washing or other cleaning which may be necessary to make it conform to the above requirements, and the final measurement shall be made in position after the sand is put in place as required.

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## General Clauses.

285. Plans and Specifications.—The plans and specifications are intended to be explanatory of each other, but should any discrepancy



appear, or any misunderstanding arise, as to the import of anything contained in either, the explanation of the Engineer Officer in charge shall be final and binding on the contractor; and all directions, explanations, and detailed or corrected plans, required or necessary to complete any of the provisions of these plans and specifications and give them due effect, will be given by the Engineer Officer in charge.

286. Lines and Grades.—All lines and grades will be given by the Engineer Officer in charge. The contractor shall furnish such assistance and materials as may be needed to establish such marks, which must be carefully preserved.

287. Inspection.—The Engineer Officer in charge and his assistants shall have access at all times to all parts of any work being done, for purposes of inspection, measurement and establishing lines and grades. Any inferior work allowed by inspectors, or done during their absence, shall not relieve the contractor from repairing the work and removing faulty materials at his own cost. The contractor shall personally supervise the work, and when not personally present, shall be represented by a competent foreman or agent who shall have full authority to act as the contractor's legal representative.

288. Workmen.—Only competent and skilful workmen shall be employed by the contractor, and any workman who, in the opinion of the Engineer Officer in charge, is incompetent, disorderly, or who disobeys or evades instructions or embarrasses the progress of the work, shall be discharged from the work and not again employed thereon without the consent of the Engineer Officer in charge.

67 289. Time for Work.—No concrete nor puddle shall be mixed or placed, nor embankment made from December 15th to February 15th, and thereafter until the frost is out of the ground. All work damaged by frost shall be made good by the contractor without additional expense to the United States.

290. Cleaning Up.—At his own expense the contractor shall satisfactorily clean, maintain and leave in neat condition all ground occupied by him and all work done under this contract.

291. Extra Work.—The contractor shall do any work not herein otherwise provided for which may be necessary for the proper completion of the work, if required, but no such work shall be allowed or paid for except upon a written order signed by the Engineer Officer in charge, at prices approved by him, and there shall be no claim for extra work or materials or for damage sustained except under this article.

292. In case no price is agreed upon, or if the Engineer Officer in charge shall so order, the actual cost of the work and materials shall be determined by the Engineer Officer in charge, and the contractor shall receive as full compensation for such work and materials, the actual cost with 15 per cent added.

293. Work Done by United States.—The United States will construct the gatehouses, sand washers, pumping station, macadam roadways and other structures not included in these specifications and necessary for the completeness of the plant, and the work to be done under these specifications shall be carried on so as to facilitate



and not to discommode the prosecution of that and other adjoining and contiguous work, whether done by the United States or by another contractor.

294. Roadways.—The United States will cause to be maintained by the contractor reasonable passageways and roadways, leaving the necessary clear space, and the work under each class shall at all times be so carried on as not to interfere with any other work done in connection with this plant.

295. Putting Filters in Service.—Upon the completion of any part of the work the Engineer Officer in charge may fill such part with water and put it in service, after giving due notice to the contractors of his intention so to do. The contractors shall permit the Engineer Officer in charge or his representatives to have access to all parts of the work for this purpose and to take charge of all gates. Such use or tests of parts of the work shall not be construed as an acceptance of them, but the contractors shall be liable for, and shall make good, all defects in construction which may then or thereafter be apparent, but the contractors shall not be liable for any damage caused to the work by the acts of the Engineer Officer in charge or his representative after such use, unless such damage shall have resulted from defects for which the contractors were responsible.

296. Alterations.—If an emergency demands, or if the Engineer Officer in charge deems it desirable, he shall have and is hereby given the right and power to make any alterations or changes in the line, grade, plan, form position, dimensions, details, quality or materials of the work herein contemplated, or any part thereof, either before or after the commencement of construction, but in case of such changes and alterations, the same shall be ordered in writing by the Engineer Officer in charge. If such alterations or any other cause diminish the quantity of work to be done from that exhibited at the time of letting or if any of the items shall be omitted, reasonable written notice having been given, they shall not constitute a claim, and no claim for damages or for anticipated profits on the work that may be dispensed with shall be made by any contractor; if the amount of work in any class is increased such increase shall be paid for according to the quantity actually done and at the price established for such work under the contract.

297. Beginning and Progress of Work.—The contractor for the whole or for each class of work shall commence work on the ground, or delivery of materials, within thirty days after being notified to that effect by the Engineer Officer in charge, and thereafter shall prosecute the work, or make delivery, with all due diligence and at such reasonable rates as may be required by the Engineer Officer in charge, and as to whether the rate of progress required is reasonable and the rate made is satisfactory the Engineer Officer in charge shall be the sole judge.

298. Completion.—It is the intention and expectation that the entire plant will be completed and ready for operation on or before December 1, 1904, and such a rate of progress will be required as will insure the completion of all the work by the date above named. Any contractor who is awarded one or more classes of work will be

required to so conduct his operations as not to materially delay, interfere with or discommode the work of other contractors, or that which may be done by the United States. The Engineer Officer in charge will endeavor to keep such delay or interference down to a minimum, but the fact of unavoidable delay or interference of this kind shall not be made the basis of any claim against the United States. The Engineer Officer in charge will make every effort to secure the prompt and timely delivery of all classes of material herein specified to be furnished or placed by the United States. But any delay in furnishing or placing such materials shall not be made the basis of any claim against the United States.

299. The quantities assumed, and upon which bids will be canvassed, are as shown in form of proposals. See also Par. 20.

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*Proposals for Filter Materials and Work.*

— —, 1903.

Lieut. Colonel A. M. Miller, Corps of Engineers, U. S. Army, Washington, D. C.

COLONEL: In accordance with your advertisement of March 19, 1903, inviting proposals for work and materials for filtration plant, and subject to all the conditions and requirements thereof, and of your specifications of same date, copies of both of which are hereto attached and, so far as they relate to this proposal, are made a part of it, we or I propose to perform the work or furnish the materials required as follows, all quantities specified being "more or less."

	Per unit.		Total.	
	Dols.	Cents.	Dols.	Cents.
Excavation:				
A. 880,000 cubic yards at (—) cents per cubic yard.....	.....	.....	.....	.....
Embankment under Filters:				
A. 65,400 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....	.....	.....
Other Embankment:				
A. 46,700 cubic yards at (—) dollars and (—) cents per cubic yard....	.....	.....	.....	.....
Filling Over Filters:				
A. 123,400 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....	.....	.....
Puddle:				
A. 2,000 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....	.....	.....
71 Seeding:				
A. 31 acres at (—) dollars and (—) cents per acre.....	.....	.....	.....	.....

	Per unit. Dols. Cents.	Total. Dols. Cents.
<b>Sodding:</b>		
A. 9,700 square yards at (—) dollars and (—) cents per square yard....	.....	.....
<b>Concrete in Floors:</b>		
B. 39,300 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....
<b>Concrete in Walls:</b>		
B. 26,300 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....
<b>Concrete in Piers:</b>		
B. 8,200 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....
<b>Concrete in Vaulting:</b>		
B. 37,400 cubic yards at (—) dollars and (—) cents per cubic yard.....	.....	.....
<b>Granolithic Pavement:</b>		
B. 35,000 square yards at (—) dollars and (—) cents per square yard....	.....	.....
<b>Placing Materials in Masonry:</b>		
B. Placing materials in masonry, complete, (—) dollars and (—) cents per filter.....	.....	.....
<b>Drainage of Roofs:</b>		
B. Drainage of roofs at (—) dollars and (—) cents per filter.....	.....	.....
<b>Steel Pipe:</b>		
C. Steel pipe system, complete, lump sum, (—) dollars and (—) cents..	.....	.....
72 <b>Cast-iron Pipe:</b>		
D. Cast-iron pipe and specials, complete, lump sum, (—) dollars and (—) cents.....	.....	.....
<b>Sand Washer Pipe:</b>		
D. Sand washer system, complete, lump sum, (—) dollars and (—) cents..	.....	.....

	Per unit.	Total.
	Dols. Cents.	Dols. Cents.
Pressure Pipe System:		
D. Laying pressure pipe system, material to be furnished by United States, lump sum, (—) dollars and (—) cents .....		
Exterior Drainage System and Manholes:		
E. Exterior drainage system and man-holes, complete, lump sum, (—) dollars and (—) cents.....		
Central Underdrains in Filters:		
F. Central underdrains, complete, at (—) dollars and (—) cents per lineal foot.....		
Interior Drainage System:		
F. Interior drainage system, with open joints, at (—) dollars and (—) cents per filter.....		
Filter Gravel:		
G. 42,300 cubic yards filter gravel at (—) dollars and (—) cents per cubic yard .....		
73 Filter Sand:		
G. 140,200 cubic yards filter sand at (—) dollars and (—) cents per cubic yard .....		
Other Work:		
The reasonable cost of the same, as determined by the Engineer Officer in charge, with 15 per cent added.....		

We or I make this proposal with a full knowledge of the kind, quantity, and quality of the articles required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within the time designated in the specifications, with good and sufficient sureties for the faithful performance thereof.

(Signature) .....

(Address) .....

(Signature) .....

(Address) .....

(Signature) .....

(Address) .....

[Signed in duplicate.]

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Form 18<sup>1</sup>.*Guaranty to Accompany Proposal.*

(When Guarantor is a Corporation.)

The — of —, a corporation existing under the laws of the State of —, hereby undertake that if the bid of — here-with accompanying, dated —, 1903, for furnishing — be accepted as to any or all of the items of supplies, materials, and services proposed to be furnished thereby, or as to any portion of the same, within sixty days from the date of the opening of proposals therefor, the said bidder —, will, within ten days after notice of such acceptance, enter into a contract with the proper officer of the United States to furnish such articles of supplies and materials and such services of those proposed to be furnished by said bid as shall be accepted, at the prices offered by said bid and in accordance with the terms and conditions of the advertisement inviting said proposals, and the specifications accompanying the same, and will give bond with good and sufficient surety or sureties, as may be required, for the faithful and proper fulfillment of such contract. And said corporation hereby binds itself and its successors to pay to the United States, in case the said bidder shall fail to enter into such contract or give such bond within ten days after said notice of acceptance, the difference in money between the amount of the bid of said bidder on the articles or services so accepted and the amount for which the proper officer of the United States may contract with another party to furnish said articles and services, if the latter amount be in excess of the former.

In witness whereof, the name and corporate seal of said corporation has been hereto affixed this — day of —, 1903, and these presents duly signed by its —, pursuant to a resolution of  
75 its —, passed on the — day of —, A. D. 190—, a copy of the record of which is on file in the War Department.

Attest:

— —,  
— —

By — —,  
— —.

(Executed in Duplicate.)

1. The president or officer authorized to sign for the corporation.
2. The board of directors or other governing body of the corporation.
3. Here affix the corporate seal.

## Form 18.

*Guaranty to Accompany Proposal.*

(When Guarantors are Individuals.)

We, — of —, in the County of — and State of —, and —, of —, in the County of — and State of —, hereby undertake that if the bid of — herewith accompanying, dated —, 1903, for furnishing — be accepted as to any or all of the items of supplies, materials, and services proposed to be furnished thereby, or as to any portion of the same, within sixty days from the date of the opening of proposals therefor, the said bidder, will, within ten days, after notice of such acceptance, enter into a contract with the proper officer of the United States to furnish such articles of supplies and materials and such services of those proposed to be furnished by said bid as shall be accepted, at the prices offered by said bid and in accordance with the terms and conditions of the advertisement inviting said proposals, and the specifications accompanying the same, and will give bond with good and sufficient surety or sureties as may be required for the faithful and proper fulfillment of such contract. And we bind ourselves, our heirs, executors, and

76 administrators, jointly and severally, to pay to the United States, in case the said bidder shall fail to enter into such contract or give such bond within ten days after said notice of acceptance, the difference in money between the amount of the bid of said bidder on the articles or services so accepted and the amount for which the proper officer of the United States may contract with another party to furnish said articles and services, if the latter amount be in excess of the former.

Given under our hands and seals this — day of —, nineteen hundred and three.

In presence of—

— —  
— —

as to — —.\*  
as to — —.\*

\*Affix adhesive seal.

STATE OF —,  
County of —, ss:

I, —, one of the guarantors named in the foregoing guaranty, do swear that I am pecuniarily worth the sum of — dollars over and above all my debts and liabilities.

Subscribed and sworn to before me this — day of —, 1903,  
at —,

— —.\*



STATE OF \_\_\_\_\_,  
County of \_\_\_\_\_, ss:

I, \_\_\_\_\_, one of the guarantors named in the foregoing guaranty, do swear that I am pecuniarily worth the sum of \_\_\_\_\_ dollars over and above all my debts and liabilities.

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 1903,  
at \_\_\_\_\_.

I, \_\_\_\_\_, do hereby certify that \_\_\_\_\_ and \_\_\_\_\_, the guarantor above named, \_\_\_\_\_ personally known to me, and that, to the best of my knowledge and belief, \_\_\_\_\_<sup>1</sup> is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

I, \_\_\_\_\_, do hereby certify that \_\_\_\_\_, the guarantor above named, is personally known to me, and that, to the best of my knowledge and belief, he is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

<sup>1</sup> The oath to be taken before a United States commissioner, a clerk of a United States court, a notary public or some other officer having general authority to administer oaths. If the officer has an official seal it must be affixed, otherwise the proper certificate as to his official character must be furnished.

<sup>2</sup> This certificate to be by a judge or clerk of a United States court, a United States district attorney, United States commissioner, or a judge or clerk of a State court of record with the seal of said court attached. If the official can make the certificate as to both sureties, it will not be necessary to fill out the next form below.

<sup>3</sup> He or each.

#### Form 19a.

1. This Agreement entered into this fourth day of April, nineteen hundred and three, between Lieut. Colonel A. M. Miller, Corps of Engineers, United States Army, of the first part, and L. E. Smoot, of Washington, in the District of Columbia, of the second part, Witnesseth, that in conformity with the advertisement and specifications hereunto attached, which form a part of this contract, the said Lieut. Colonel A. M. Miller, Corps of Engineers, U. S. Army, for and in behalf of the United States of America, and the said L. E. Smoot do covenant and agree, to and with each other, as follows:

The said party of the second part agrees to furnish and deliver in place, in strict accordance with the provisions of the attached specifications, forty-two thousand three hundred (42,300) cubic yards,

more or less, of filter gravel, and one hundred and forty thousand two hundred (140,200) cubic yards, more or less, of filter sand; and the said party of the first part agrees to pay to the  
78 said party of the second part at the rate of two dollars and seventy-five cents (\$2.75) per cubic yard for filter gravel, and two dollars and sixty-five cents (\$2.65) per cubic yard for filter sand, for all gravel and sand so delivered and accepted.

2. All materials furnished and work done under this contract shall, before being accepted, be subject to a rigid inspection by an inspector appointed on the part of the Government, and such as do not conform to the specifications set forth in this contract shall be rejected. The decision of the engineer officer in charge as to quality and quantity shall be final.

3. The said party of the second part shall commence, prosecute, and complete the work herein contracted for as set forth in paragraphs 275-284 of the attached specifications.

4. If, in any event, the party of the second part shall delay or fail to commence with the delivery of the material or the performance of the work on the day specified herein, or shall in the judgment of the engineer in charge, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally appointed, shall have power, with the sanction of the Chief of Engineers, to annul this contract by giving notice in writing to that effect to the party (or parties, or either of them) of the second part, and upon the giving of such notice all payments to the party or parties of the second part under this contract shall cease, and all money or reserved percentage due or to become due the said party or parties of the second part, by reason of this contract, shall be retained by the party of the first part until the final  
completion and acceptance of the work herein stipulated to

79 be done; and the United States shall have the right to recover from the party of the second part whatever sums may be expended by the party of the first part in completing the said contract in excess of the price herein stipulated to be paid the party of the second part for completing the same, and also all costs of inspection and superintendence incurred by the said United States, in excess of those payable by the said United States during the period herein allowed for the completion of the contract by the party of the second part; and the party of the first part may deduct all the above-mentioned sums out of or from the money or reserved percentage retained as aforesaid; and upon the giving of the said notice the party of the first part shall be authorized to proceed to secure the performance of the work or delivery of the materials, by contract or otherwise in accordance with law.

5. It is further agreed that if the party of the second part shall fail to prosecute the work covered by this contract so as to complete the same within the time agreed upon, the party of the first part may, with the prior sanction of the Chief of Engineers, in lieu of annulling the contract under the preceding paragraph waive the time limit and permit the party of the second part to finish the work.

within a reasonable period, to be determined by the said party of the first part. Should the original time limit be thus waived, all expenses for inspection and superintendence, and all other actual losses and damages to the United States due to the delay beyond the time originally set for completion shall be determined by the said party of the first part and deducted from any payments due or to become due the party of the second part: Provided, however, that the party of the first part may, with the prior sanction of the Chief of Engineers,

80      remit the charge for expenses of inspection and superintendence for so much time as in the judgment of the said party of the first part may actually have been lost on account of unusual freshets, ice, rainfall, or other abnormal force or violence of the elements, or by epidemics, local or State quarantine restrictions, or other unforeseeable cause of delay arising through no fault of the party of the second part, and which actually prevented him (or them) from commencing or completing the work or delivering the materials within the period required by the contract, but such waiver of the time and remission of charges shall in no other manner affect the rights or obligations of the parties under this contract.

6. If, at any time during the prosecution of the work, it be found advantageous or necessary to make any change or modification in the project, and this change or modification should involve such change in the specifications as to character and quantity, whether of labor or material, as would either increase or diminish the cost of the work, then such change or modification must be agreed upon in writing by the contracting parties, the agreement setting forth fully the reasons for such change, and giving clearly the quantities and prices of both material and labor thus substituted for those named in the original contract, and before taking effect must be approved by the Secretary of War: Provided, that no payments shall be made unless such supplemental or modified agreement was signed and approved before the obligation arising from such modification was incurred.

7. No claim whatever shall at any time be made upon the United States by the party or parties of the second part for or on account of any extra work or material performed or furnished, or alleged to have been performed or furnished under or by virtue of this contract, and not expressly bargained for and specifically included therein, unless such extra work or materials shall have been 81      expressly required in writing by the party of the first part or his successor, the prices and quantities thereof having been first agreed upon by the contracting parties and approved by the Chief of Engineers.

8. The party of the second part shall be responsible for and pay all liabilities incurred in the prosecution of the work for labor and material.

9. It is further agreed by and between the parties hereto that until final inspection and acceptance of, and payment for, all of the material and work herein provided for, no prior inspection, payment, or act is to be construed as a waiver of the right of the party of the

first part to reject any defective work or material or to require the fulfillment of any of the terms of the contract.

10. The party of the second part further agrees to hold and save the United States harmless from and against all and every demand, or demands, of any nature or kind for, or on account of, the use of any patented invention, article, or process included in the materials hereby agreed to be furnished and work to be done under this contract.

11. Payments shall be made to the said party of the second part as prescribed in paragraphs 39 and 42 of the specifications hereto attached and forming part of this agreement.

12. Neither this contract nor any interest therein shall be transferred to any other party or parties, and in case of such transfer the United States may refuse to carry out this contract either with the transferrer or the transferee, but all rights of action for any breach of this contract by said L. E. Smoot are reserved to the United States.

13. No Member of or Delegate to Congress, nor any person belonging to, or employed in, the military service of the United States, is or shall be admitted to any share or part of this contract, or 82 to any benefit which may arise herefrom.\*

14. This contract shall be subject to approval of the Chief of Engineers, U. S. A.

In witness whereof the parties aforesaid have hereunto placed their hands the date first hereinbefore written.

Witnesses:

PICKERING DODGE <i>As to</i>	A. M. MILLER,
	<i>Lt. Col., Corps of Engrs., U. S. Army.</i>
A. T. HARLAN <i>As to</i>	L. E. SMOOT.
— — — <i>As to</i> — —	

(Executed in quintuplicate.)

Approved: April 20, 1903.

G. S. GILLESPIE,  
*Brig. Gen., Chief of Engineers, U. S. Army.*

†I do solemnly swear that the copy of contract hereto annexed is an exact copy of a contract made by me personally with —; that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said — or any other person; and that the papers accompanying include all those relating to the said contract as required by the statute in such case made and provided.

—, *Corps of Engineers.*

Subscribed and sworn to before me this — day of —, 190—.

—, —.

83 I certify that the award of the foregoing contract was made to the lowest responsible bidder for the best and most suitable articles and service, on proposals received in response to advertisement hereto attached, which was published for — days by § — and that further advertisement was impracticable.

Contracting Officer.

\* NOTE.—Here add to any contract made with an incorporated company for its general benefit the following words, viz.: "But this stipulation, so far as it relates to Members of or Delegates to Congress, is not to be construed to extend to this contract."—See Sec. 3740, Revised Statutes.

† NOTE.—This affidavit is required only on the quintuplicate copy of contract intended for the Returns Office, Department of the Interior.—A. R. 635.

‡ NOTE.—Certificate to be given by the contracting officer on the copies of the contract for the Chief of Engineers, and the Auditor for the War Department.

§ NOTE.—Insert "newspaper" or "poster and circular letter," etc., as the case may be.

NOTE.—The copy of contract for the Bureau must be accompanied with an abstract of the bids, and copy of each bid and advertisement unless previously furnished.—A. R. 626.

NOTE.—The name of the principal intended to be bound as party of the second part, whether an individual, a partnership, or a corporation, should be inserted in and signed to the contract. An officer of a corporation, a partner, or an agent signing for the principal should add his name and designation after the word "by" and under the name of the principal; and an agent of the principal or an officer, if the principal be a corporation, should file evidence of his authority.

[Endorsed:] Form 19a; Authorized April 30, 1896, with amendments to April 15, 1902; Articles of Agreement entered into April 4, 1903, between Lt.-Col. A. M. Miller, Corps of Engrs. of the one part, and L. E. Smoot of the other part, for filter gravel and filter sand.

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### "EXHIBIT B."

Subject: Filtration Plant.  
Feb. 18, 1905.

UNITED STATES ENGINEER OFFICE,  
1000 22ND ST. N. W.  
WASHINGTON, D. C., February 17, 1905.

Mr. L. E. Smoot, Foot of 3rd St. S. E., Washington, D. C.

DEAR SIR: Having in view the systematic and orderly sequence of work on the Washington Aqueduct Filtration Plant from the present time until its completion, and for the purpose of so regulat-

ing its progress as to enable each of the contractors engaged on the work to prosecute his particular part to the best advantage and with the greatest energy, with a minimum of interference by the presence or operations on his ground of other contractors, I have laid down a general program of work to be done during each of the months from now on, of which program the portion relating to your particular contract is as follows:

### February and March.

Filter stone, complete	beds 15, 16, 17.....	about 1,000 cu. yds.
" sand, "	" 17, 18, 21, 22...	" 19,000 " "

### April.

Filter stone, complete	3, 4, 5.....	about 2,000 cu. yds.
" sand, "	15, 16, 20.....	18,000 " "

### May.

Filter stone, complete	1, 2.....	2,920 cu. yds.
" sand, "	3, 4, 5, begin 1..	21,000 " "

### June.

Filter stone, complete	8, 9, 13, 14.....	5,840 cu. yds.
Filter sand, complete	1, 2, 9, 14.....	21,000 cu. yds.

### July.

Filter stone, complete	6, 7, 11, 12.....	5,840 cu. yds.
" sand, "	7, 8, 13, begin 12..	21,000 " "

85

### August.

Filter stone, complete	10, 25, 26, 27.....	5,840 cu. yds.
" sand, "	10, 11, 12, 6.....	21,000 " "

### September.

Filter stone, complete	28, 29.....	2,920 cu. yds.
" sand, "	25, 26, 27.....	18,000 " "

### October.

Filter sand, complete	28, 29.....	12,000 cu. yds.
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In the program outlined above the quantity of sand going into each bed has been assumed as 6,000 cubic yards. The depth of sand varies for the different beds, but 6,000 yards is about the average. Three and one-half beds *has* been indicated as a month's work. In



some cases  $3\frac{1}{2}$  beds will require more than 21,000 cubic yards of sand while in others they will require less. In any case the yardage is the item to which especial attention must be paid, and this should in all cases be equal to that indicated in the program.

The order in which the beds are to be filled may, with the consent, or by direction of the engineer officer in charge, be varied as may later be found necessary or desirable.

Where particular localities are named for work, as, for example, in beds of specified numbers, the right is reserved to require an equal quantity of work during the same month in a different locality, but this right will be exercised with great reserve, and only when it is manifest to the engineer officer that no hardship will result to the contractor from the change.

You are required to take notice that the quantities of work, and, unless otherwise ordered, the locations of the same above scheduled for the several months, will be rigorously exacted as a minimum, and any failure on your part to perform in any month the quantity of work stipulated for that month will be considered by me as sufficient cause for the exercise of the right reserved to the United

86 States in paragraph 37 of the specifications to the contract to purchase needed materials in the open market; of the discretion given me in paragraph 39 of the specifications to suspend monthly estimates and payments, and the right conferred upon me in paragraph 41 of the specifications, after five days' notice, to annul the contract and take possession of your plant, and so forth, at a rental valuation to be determined by myself.

A program for the work to be done by the United States has been arranged in harmony with those laid down for the several contractors, and all the programs are so arranged that any of the contractors can do more than the amounts laid down for them without interfering with the others, but they can not do less.

Very respectfully,

SMITH S. LEACH,  
*Lieut. Colonel, Corps of Engineers.*

87 II. Amended Petition. Filed Be Leave of Court February 19, 1909.

In the Court of Claims.

No. 29903.

LEWIS E. SMOOT

vs.

THE UNITED STATES.

Amended Petition.

To the Honorable Chief Justice and Associate Justices of the Court of Claims:

Now comes the petitioner, by leave of the court heretofore had, and amends the eighth, ninth, and twelfth paragraphs of his petition, so as to read as follows:

8. Petitioner further shows that thereafter, to-wit, on the 29th day of May, 1905, while this petitioner was engaged in fulfilling his said contract, and the said order of February 17, 1905, according to their respective terms, the officer in charge of said work and representing the defendant United States, without right and without notice to this petitioner, and without his consent and against petitioner's protest, reduced the quantity of additional sand required by the said order of February 17, 1905, by the amount of 21,506 cubic yards, and although this petitioner tendered himself ready to fulfill said contract and order of February 17, 1905, to supply and deliver

all of the sand required to be furnished by said order, yet the  
88 said officer in charge refused to receive the same to the great damage and injury of petitioner.

9. Petitioner further shows that by reason of the failure and refusal of the defendant to accept the whole of the additional quantity of sand provided for in the said order of February 17, 1905, the petitioner lost the profit which he otherwise would have realized had he been permitted to supply the whole of the sand provided for in said order amounting to the sum of, to-wit, \$32,252.28, and further was damaged in the sum of, to-wit, \$12,501.71, the amount of expenditure required to be made by him to provide the additional plant, machinery, tools, etc., required to be, and which actually were, provided by petitioner in order to fulfill said order of February 17, 1905, and to supply the additional quantity of sand therein ordered within the time therein specified, less the sum of \$2,294.08, the value of materials of said plant sold or on hand and available for use.

12. Petitioner therefore prays judgment against the United States for the sum of \$32,252.28, with interest thereon from the first day of November, 1905, the amount of the profits which petitioner would have realized had he been permitted to supply the whole quality of filter sand as ordered on February 17, 1905; and for the sum of \$10,207.63, the amount of the expenditures necessarily made by petitioner to carry out the requirements for the extra quantity of sand required by the said order of February 17, 1905, with interest thereon from the first day of June, 1905.

LEWIS E. SMOOT.

WM. G. JOHNSON,  
*Attorney for Claimant.*

DISTRICT OF COLUMBIA, ss:

On this 18th day of February, A. D. 1909, personally appeared  
before me Lewis E. Smoot, and made oath that he had read  
89 the foregoing petition by him subscribed, and knew the contents thereof, and that the facts therein stated on his personal knowledge are true, and the facts therein stated upon information and belief, he believes to be true.

Witness my hand and notarial seal this 18th day of February, A. D. 1909.

[NOTARIAL SEAL.]

J. WM. REILY,  
*Notary Public, D. C.*

90

III. *Traverse. Filed February 15, 1912.*

In the Court of Claims of the United States, December Term, A. D. 1912.

No. 29903.

LEWIS C. SMOOT  
VS.  
THE UNITED STATES.

And now comes the Attorney General, on behalf of the United States, and answering the petition of the claimant herein, denies each and every allegation therein contained; and asks judgment that the petition be dismissed.

HUSTON THOMPSON,  
*Assistant Attorney General.*

91

IV. *Argument and Submission of Case.*

On the 15th day of February, 1912, this case came on to be heard. Mr. William G. Johnson was heard in behalf of the claimant; Mr. Franklin W. Collins was heard in opposition thereto and the case was submitted.

92 V. *Findings of Fact as Finally Amended, Conclusion of Law, and Opinion of the Court. Filed June 2, 1913.*

This case having been heard by the Court of Claims, the court, upon the evidence, makes the following

## Findings of Fact.

## I.

Heretofore, to wit, on the 4th of April, 1903, Lieut. Col. A. M. Miller, Corps of Engineers, United States Army, for and on behalf of the United States entered into a written contract with the claimant, Lewis E. Smoot, which contract was by its terms subject to the approval of the Chief of Engineers, by which claimant was to furnish and deliver in place in beds at the Washington filtration plant 140,200 cubic yards, more or less, of filter sand, at \$2.65 per cubic yard, which said contract in its entirety is made a part hereof, and a copy of which is annexed to the petition herein and marked "Exhibit A." Said contract as provided therein was duly approved in writing on April 20, 1903, by G. S. Gillespie, Chief of Engineers, United States Army.

## II.

Said filter sand was to be deposited in 29 beds, and the defendants agreed to cause to be done all necessary work to construct said beds in condition ready to receive said filter sand.

## III.

On July 15, 1904, claimant was notified in writing by Lieut. Col. Miller that he would be prepared to receive gravel and sand in place on August 1, 1904, and requested him to make arrangements to begin delivery by that date.

Claimant proceeded with the execution of said contract and delivered in place during the month of August, 1904, 1,260 cubic yards of filter sand, in the month of September, 1904, 1,540 cubic yards, in the month of October, 1904, 4,920 cubic yards, in the month of November, 1904, 10,520 cubic yards, in the month of December, 1904, 2,420 cubic yards, and in the month of January, 1905, up to and including the 3d day, 276 cubic yards, making in all up to said last mentioned date 20,936 cubic yards of filtered sand delivered in place.

93

## IV.

Prior to making of the contract herein the Government had employed Allen Hazen as a consulting engineer to prepare the specifications for the work on the filtration plant and to advise the Government officer in charge of said work from time to time during its progress.

In the original specifications prepared by said Hazen the quantity of filter sand to be put in the 29 beds was required to aggregate 140,200 cubic yards, more or less, after settlement with water upon it for one week, and said specifications were used in the first advertisement for bids for the work; but all bids thereon were rejected.

In the second advertisement for bids, under which this contract was made, the same specifications were used, requiring the same aggregate quantity of 140,200 cubic yards, more or less, for the 29 beds, but the words "after settlement one week with water and with the filter in operation" were stricken out without the knowledge of the said Hazen, and as so modified said specifications were attached to and made a part of said contract.

The physical effect of this change in the specifications was to reduce the aggregate quantity of sand from that required by the original specifications prepared by said Hazen to the extent of the compacting or shrinkage that would ensue from settlement with water.

## V.

In October, 1904, a discussion took place between the consulting engineer, Allen Hazen, and Edward D. Hardy, a civil engineer who was assistant to Capt. William P. Wooten, then temporarily in charge of the work, at which claimant was present, concerning the change in the specifications as originally prepared by said Hazen

and the necessity for an increase in the quantity of sand to be furnished over and above that specified in the contract sufficient to cover the amount of shrinkage which would ensue after settlement with water, so as to bring the total quantity up to the requirements of said original specifications, which provided for measuring the quantity after settlement. At that time Mr. Hazen suggested 1 inch per foot and 1 inch additional for each bed as an approximation of the increase necessary, and a computation was made on that basis, but no definite decision or determination was then arrived at as to the quantity and no agreement was reached nor contract of any kind made. Capt. Wooten, while still in charge of the work, was informed by said Hardy of said conversation of said Hazen in regard to the increase in the quantity of sand.

At the time of the suggestion made by Mr. Hazen and at the time that Capt. Wooten was informed of the conversation between Hazen and Hardy in the presence of the claimant, the supply of sand furnished by the claimant was very small. The conversation between the parties was general and related to the possibilities and probabilities of a change respecting any increase at all over the 140,000 cubic yards, more or less, mentioned in the contract, and had reference to the element of shrinkage, for which provision was not made in the new specifications. The increase actually recommended by Hazen when the exact amount was fixed after April 18, and upon which the Government acted, amounted to 1 inch per foot and 1 inch additional to cover all emergencies. The increase provided for 17,000 cubic yards on the basis mentioned. No definite increase was decided or fixed upon until Mr. Hazen, the consulting engineer to whom the matter was referred, had made his report.

## VI.

On November 30, 1904, Lieut. Col. Smith S. Leach, Corps of Engineers, United States Army, the engineer officer in charge of the work under said contract, wrote to claimant that the time limit upon the contract would be waived, on behalf of the United States, for a reasonable time.

## VII.

By the 3d of January, 1905, 15 of the 29 beds were completed ready to receive sand. Some time prior thereto, said Hazen not having made any more definite or precise statement of the exact amount of sand to be required, said Hardy made computations upon the basis of said Hazen's recommendation, and he and Lieut. Col. Leach, the engineer officer in charge, estimated the approximate aggregate quantity of sand to be required. On said date Lieut. Col. Leach wrote to claimant directing him to complete the deliveries of sand in said 15 beds by May 15, by placing in the same 70,000 cubic yards of sand in addition to the 20,936 cubic yards then in place in said beds, making the total requirement for said 15 beds 90,936 cubic yards. To this letter claimant replied on January 5, to the effect that his plant had a capacity amply sufficient to maintain the

delivery required except under very unfavorable weather conditions when the freezing water prevented him from getting the sand as clean as required, and that he had already taken steps to build another plant of the same capacity, which he said would not be very expensive.

### VIII.

The total deliveries of sand in place by claimant up to and including January 31, 1905, aggregated 25,270 cubic yards, and from February 1 to 17, 1905, both inclusive, claimant delivered 2,961 cubic yards, making a total of 28,231 cubic yards of sand delivered and in place on February 17, 1905, on which date Lieut. Col. Leach, the engineer officer in charge of the work for the United States wrote to claimant the following letter:

"Subject: Filtration Plant, February 18, 1905.

"United States Engineer Office, 1000 22nd St. N. W.

"WASHINGTON, D. C., February 17, 1905.

"Mr. L. E. Smoot, Foot of 3rd St. S. E., Washington, D. C.

"DEAR SIR: Having in view the systematic and orderly sequence of work on the Washington Aqueduct filtration plant from the present time until its completion, and for the purpose of so regulating its progress as to enable each of the contractors engaged on the work to prosecute his particular part to the best advantage and with the greatest energy, with a minimum of interference by the presence or operations on his ground of other contractors, I have laid  
95 down a general program of work to be done during each of the months from now on, of which program the portion relating to your particular contract is as follows:

#### February and March.

Filter stone, complete beds 15, 16, 17....about 1,000 cubic yards.  
Filter sand, complete beds 17, 18, 21, 22...about 19,000 cubic yards.

#### April.

Filter stone, complete 3, 4, 5.....about 2,000 cubic yards.  
Filter sand, complete 15, 16, 20.....about 18,000 cubic yards.

#### May.

Filter stone, complete 1, 2..... 2,920 cubic yards.  
Filter sand, complete 3, 4, 5, begin 1..... 21,000 cubic yards.

#### June.

Filter stone, complete 8, 9, 13, 14..... 5,840 cubic yards.  
Filter sand, complete 1, 2, 9, 14..... 21,000 cubic yards.



## July.

Filter stone, complete 6, 7, 11, 12..... 5,840 cubic yards.  
 Filter sand, complete 7, 8, 13, begin 12..... 21,000 cubic yards.

## August.

Filter stone, complete 10, 25, 26, 27..... 5,840 cubic yards.  
 Filter sand, complete 10, 11, 12, 6..... 21,000 cubic yards.

## September.

Filter stone, complete 28, 29..... 2,920 cubic yards.  
 Filter sand, complete 25, 26, 27..... 18,000 cubic yards.

## October.

Filter sand, complete 28, 29..... 12,000 cubic yards.

"In the program outlined above the quantity of sand going into each bed has been assumed as 6,000 cubic yards. The depth of sand varies for the different beds, but 6,000 yards is about the average. Three and one-half beds has been indicated as a month's work. In some cases  $3\frac{1}{2}$  beds will require more than 21,000 cubic yards of sand while in others they will require less. In any case the yardage is the item to which especial attention must be paid, and this should in all cases be equal to that indicated in the program.

"The order in which the beds are to be filled may, with the consent, or by direction of the engineer officer in charge, be varied as may later be found necessary or desirable.

"Where particular localities are named for work, as, for example, in beds of specified numbers, the right is reserved to require an equal quantity of work during the same month in a different locality, but this right will be exercised with great reserve, and only when it is manifest to the engineer officer that no hardship will result to the contractor from the change.

"You are required to take notice that the quantities of work, and, unless otherwise ordered, the locations of the same above scheduled for the several months, will be rigorously exacted as a minimum, and any failure on your part to perform in any month the quantity of work stipulated for that month will be considered by me as sufficient cause for the exercise of the right reserved to the United States

in paragraph 37 of the specifications to the contract to purchase needed materials in the open market; of the discretion given me in paragraph 39 of the specifications to suspend monthly estimates and payments; and the right conferred upon me in paragraph 41 of the specifications, after five days' notice, to annul the contract and take possession of your plant, and so forth, at a rental valuation to be determined by myself.

"A program for the work to be done by the United States has been arranged in harmony with those laid down for the several contractors, and all the programs are so arranged that any of the contractors

can do more than the amounts laid down for them without interfering with the others, but they can not do less.

"Very respectfully,

SMITH S. LEACH,

*"Lieut. Colonel, Corps of Engineers."*

The amount of sand specified by this letter was 151,000 cubic yards in addition to that already in place, which would have made a total of 179,231 cubic yards. There was actually furnished by the claimant and used on the work 157,725 cubic yards, or 21,506 cubic yards of sand less than what was specified in the letter. Deliveries were commenced in August, 1904, and were completed the latter part of October, 1905.

The total profit of claimant on the contract, exclusive of the new plant, was \$215,858.39.

### IX.

In the fall of 1904 the claimant contemplated and thereafter began to make preparation and plans for the construction of an additional plant at Laurel, Md., for screening and washing the sand. The erection of this additional plant was commenced on February 24, 1905, and finished May 30, 1905. The additional plant was not used for furnishing the sand specified in the contract, nor for any part of that which was in fact furnished by claimant.

On or about March 7, 1905, the Government engineers in charge of the work devised a system of night inspection, whereby claimant's plant was enabled to run at night as well as during the day. This was done in compliance with the request of claimant that he be permitted to run his plant at night. The plant was run night and day during the months of March and April, 1905. The output of the plant was more than doubled during those months. At the end of the two months it was not found necessary to run the plant night and day, as the claimant had caught up with the other contractors on his deliveries and there were not sufficient beds in readiness to receive the sand. Thereafter the plant was run only during the day.

This system of night inspection devised by the Government engineers in charge of the work did not fall within their regular duties and was instituted by them solely for the claimant's benefit to enable him to secure more prompt and efficient deliveries and to insure the completion of the filtration plant in the requisite time. It was owing to the system of inspection, which enabled the plant to run at night and the increased efficiency of the workmen in the spring and summer of 1905 which enabled the claimant to catch up with his deliveries and keep up with the same.

At the time of the erection of the duplicate plant it was necessary that deliveries per month should be increased. The claimant  
97 had been far behind in his work, and as early as the fall of 1904 the Government engineers had been complaining of his insufficient deliveries. At that time, and on numerous occasions thereafter, the claimant suggested that he expected to erect a duplicate plant, and he frequently promised the Government engineers to

build this additional plant so as to increase his output. The construction of this duplicate plant was begun and completed in accordance with these promises to the Government engineers and to provide the means of securing increased deliveries.

This duplicate plant was not erected solely for the purpose of furnishing the 21,506 cubic yards of additional sand. The duplicate plant was erected to provide for such increased deliveries per month as were necessary under claimant's contract. After the erection of the new plant it was found that claimant's old plant was sufficient to make proper deliveries under the system of night inspection and the increased efficiency of claimant's organization on the work. It was not found necessary to have recourse to this duplicate plant to complete the proper deliveries and the duplicate plant was not used.

### X.

The actual and reasonable gross cost of the labor and material employed in the construction of said new plant was \$12,501.71, and after deducting the value of all materials sold or on hand and fit for use the net cost of the plant to the claimant amounts to \$9,888.04, which amount became a loss to claimant.

### XI.

No action appears to have been taken by Mr. Hazen from October, 1904, until April 18, 1905, with reference to fixing definitely the precise amount of the increased quantity of sand to be supplied by claimant. On the last named date he made his report to Lieut. Col. Leach fixing the aggregate amount of sand to be supplied at about 157,000 cubic yards. This report was approved and adopted by Lieut. Col. Leach and his subordinates were instructed to carry out the terms of same. Claimant was not notified of the terms of said report as to the aggregate quantity of sand to be supplied until May 29, 1905, when he was orally informed by Col. Leach. He immediately entered a protest to the engineer officer in charge against what he claimed was a reduction in the quantity of sand and insisted upon his right to supply the whole quantity ordered in said letter of February 17, 1905, and he tendered himself ready and willing to furnish same. Said protest was disregarded by the engineer officer in charge and claimant was only permitted to supply 157,725 cubic yards. Claimant had an abundant supply of sand of the kind required and ample facilities for delivering in place within the time prescribed by the order of February 17, 1905, the entire quantity required by said order.

### XII.

The claimant's total profit per cubic yard on sand delivered in place under this contract including the cost of the duplicate plant, was \$1.305.

98 The total profit per cubic yard on sand delivered in place under this contract, exclusive of the cost of the duplicate plant was \$1.368.

The net profit which claimant would have made had he been permitted to furnish an additional 21,506 cubic yards of sand under the contract would have been, in the one case \$28,065.33, and in the other case \$29,420.20.

### *Conclusion of Law.*

Upon the foregoing findings of fact the court decides as a conclusion of law that the claimant herein is not entitled to recover, and the petition is dismissed.

### *Opinion.*

Howry, *Judge*, delivered the opinion of the court:

Plaintiff entered into the contract with defendants, set forth as an exhibit to the petition, whereby he was to furnish to the defendants 140,200 cubic yards, more or less, of filter sand deliverable and put in place in the beds constructed for a filtration plant established by the United States for the purpose of filtering the water supplied by an aqueduct for the city of Washington and District of Columbia. Two demands are set forth in the petition. The first item to be considered is for an alleged outlay and the amount of expenditures, shown by the findings to be \$9,888.04, arising out of the construction of an additional plant including expenses incurred in the purchase of machinery and tools to carry out certain alleged requirements for an excess quantity of sand under an order appearing in the record.

The second item of the claim is for the net profits, amounting to \$29,420.20, which plaintiff says he would have realized had he been permitted to supply an additional 21,506 cubic yards of sand. The contract was approved April 20, 1903.

The total profits of plaintiff on the contract, exclusive of the additional plant and profits claimed on sand not delivered, were \$215,858.39. It took plaintiff about 14 months to complete the work and realize from time to time the profits made by him. That he was fortunate in securing a contract almost under the dome of the Capitol upon which he realized so handsomely affords no reason why he should not be reimbursed for the cost of the additional plant and for profits on the sand not delivered (but which he claims he should have been permitted to deliver), if by any fair interpretation of the whole agreement he is entitled to be paid more than he actually received. But these are questions now to be considered in the light of the findings.

As to the first item, the original plant was completed and deliveries under the contract commenced in August, 1904. The construction of the additional plant was commenced on February 24, 1905, and finished May 30, 1905. The last delivery of sand under the contract was made in October, 1905, one day previous to the time in which the sand was required to be supplied. The contention of the plaintiff is that this additional plant was made necessary by an order in the form of a letter of the engineer officer in charge and

was not necessary to the furnishing of sand under the contract. This order of the engineer officer was subsequently verbally modified, and the additional plant was not used because not necessary. This letter, dated February 17, 1905, was transmitted to the plaintiff and contained a specified program for the deliveries of sand under the contract. Plaintiff's further contention is that this letter was binding upon the defendants and constituted such part of the contract that the subsequent modification could not relieve the defendants from its terms. In other words, the contention appears to be that the additional plant was erected to fulfill the requirements outside the contract set forth in the letter as something independent, and that he was damaged by the subsequent modification of the terms of the letter.

The evidence does not establish the fact that this additional plant was built solely for the purpose of taking care of the deliveries of the additional quantity of sand set out in the letter. The findings do disclose that up to the month of February, 1905, plaintiff's monthly deliveries of sand had been very inadequate. Frequent complaint had been made to plaintiff by the defendants' officers, and he had been urged from time to time to increase his deliveries, lest the Government would be damaged by the failure of the plaintiff to comply with the contract. By way of meeting the requirements of the defendants' officers, plaintiff promised to increase his deliveries of sand per month, and as an evidence of his intention to carry out his undertaking according to contract he began the erection of the additional plant. The findings show that as early as the autumn of 1904 plaintiff actually contemplated the erection of the additional plant by telling the defendants' engineers of his intention. It seems to the court that the erection of the additional plant was the means taken by the plaintiff to insure proper deliveries under his contract. But by a fortunate chain of circumstances plaintiff was enabled to complete his agreement with the output of his first plant, thereby rendering unnecessary the use of the additional plant. The contributing causes of this increased output from the old plant grew out of the better organization of the working force and the operating of the old plant at night for the months of March and April, 1905. It is apparent that at the time the additional plant was erected the situation relating to deliveries of sand was so uncertain that the engineer officer in charge gave formal notice to the contractor by the letter of February 17, 1905, that the contract would be forfeited or penalties imposed if deliveries were not made more promptly.

The court is of the further opinion that the erection of the additional plant was made necessary by the slow deliveries of sand, and that in providing the means for carrying out the contract with a greater degree of certainty the construction of the additional plant was one of the proper and necessary expenses of the contract. We are therefore of opinion that plaintiff is not entitled to recover on this item.

The second item, relating to the net profits which plaintiff would have made had he been permitted to furnish an additional 21,506 cubic yards, is based likewise upon the letter of February 17, 1905,

from the engineer officer. Plaintiff contends that under this letter he was entitled to deliver the full amount of sand set out in the communication, because he says it was a part of the contract. The amount of sand actually delivered in place on the work amounted to 157,725 cubic yards.

The letter appears to be merely a designation of quantity. It sets out the amount of sand which the engineer officer in charge thought might be necessary under the contract for the completion of the work and it also provided for the method of delivery.

100 Paragraph 296 of the specifications deals with alterations in the agreement. It appears that if the engineer officer in charge deemed it desirable he was authorized to increase or diminish the quantity of work to be done. The last paragraph of this section provides:

\* \* \* "If the amount of work in any class is increased, such increase shall be paid for according to the quantity actually done, and at the price specified for such work under the contract."

Thus under this section, even though the engineer officer in charge designated a large quantity of work, it appears that the defendants would be responsible only for the amount of work actually performed.

In Mitchell's case, 19 C. Cls. R., 39, a contract was in issue which provided that it should be subject to the approval of both of the commanding generals of the division, and of the Department of Missouri. The contract was approved by both of these parties. The court held that: "It was clearly the purpose of that provision to secure to the high commanding officers a supervision over the matter, and to control or prevent the making of such a contract on the part of an inferior officer, if they or either of them saw fit to do so. When thus made the contract could not be thereafter altered by any officer inferior to those whose approval was necessary in the first place to give validity. They were officers acting for the United States in giving the consent of the defendants to the terms of the contract, and none below them in authority had a right to change the terms of their agreement."

The court does not deem it essential to the determination of the issue on the item respecting the claim for profits on account of the increase of sand to enter into the question of the necessity of an approval by the higher officers of the government of the alleged order. In the view we take of the case the matter of quantity was governed by the terms of the original agreement.

If there was any increase outside of the original contract and a new tentative arrangement was made between plaintiff and subordinate officers who were not authorized to change the agreement, the approval of higher and superior officers became necessary before any arrangement for an increase outside of the original contract became valid.

If we take the contract and specifications together, as we must, it is clear that there was no intention of setting out specifically the exact quantity of sand to be delivered. By paragraph 20 of the specifications it was provided that the quantities given were approximate only and that no claim should be made against the United



States on account of any excess or deficiency. The terms of the agreement left it uncertain whether 25 filters or 30 filters should be built by the Government; and the designation of the number of filters was left by the terms of the agreement to the discretion of the engineer officer in charge.

Plaintiff entered into the contract with full knowledge that the quantities of sand were likely to be increased or diminished to a considerable extent. In Bulkley's case, 7 C. Cls. R., 543; 19 Wall., 37, it was held that a certain notice did not amount to an agreement to furnish the amount of supplies specified and that a contractor could not recover the profits which he would have made had the freights withheld been furnished to him.

In the present case we think the effect of the letter was to signify a purpose on the part of the Government that the additional  
101 quantity of sand might be needed, but that the purpose was liable to be changed at any time. "Human affairs are largely conducted upon the principle of implications." A consideration of the character of the work required to be done in the construction of this filtration plant shows the purpose. The contract provided for the completion of the work in a specified time and its several parts had been let to different contractors. As one of these contractors finished a specified portion of the work that particular piece of it was turned over to the succeeding contractor.

From this it will be seen that it became necessary for the engineer officer in charge from time to time to map out some tentative arrangement by which the various contractors would know what work they were expected to do and in what time.

We are of opinion that the engineer officer in charge had authority to designate a plan of operations for the convenience of all the contractors and was the authority in writing for them to proceed with the work as directed. In itself this letter did not contemplate a change or modification of the original contract. The circumstances under which the letter was written show the reason for its delivery, because the contractor at that time was not only behind in his deliveries, but was in danger of forfeiting the terms of the agreement whereby the Government would have been justified in the imposition of penalties by further failure on the part of the contractor to make the deliveries more satisfactory. On this item, as well as on the first, we are of opinion that the claimant is not entitled to recover.

In concluding the discussion of the claim of the contractor that there was such an increased quantity of sand called for outside of the contract as to entitle him to compensation by way of profits based upon the letter, the court does not deem it of sufficient importance to the merits to do more than briefly advert to the fifth finding. That finding shows that a conversation took place in October, 1904, between the consulting engineer and the civil engineer, who was the assistant to the chief officer temporarily in charge of the work, at which claimant was present, concerning the change in the specifications as originally prepared and the necessity for an increase in the quantity of sand to be furnished over and above that

specified in the contract sufficient to cover the amount of shrinkage of the sand to be supplied under the contract which would ensue after settlement with water. Plaintiff's counsel thinks that this finding is material as an essential part of the *res gestæ* to explain subsequent acts and declarations of the contractor, because he says that if a computation was made at all there is necessarily established the further fact that some amount in figures was reached. As a matter of fact, no conclusion was reached with respect to the matter of any increase, for the obvious reason that the work had not, on account of the small amount of sand delivered at the time of this conference between the parties, progressed far enough for an understanding to be had on the subject. The finding shows that no understanding was had until April 18, 1905, as to any excess amount and for which amount plaintiff was paid. Accordingly, the court excludes the attempt to prove plaintiff's suppositions and thoughts about the matter as incompetent testimony.

Petition dismissed.

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#### VI. *Judgment of the Court.*

No. 29903.

LEWIS E. SMOOT

v.

THE UNITED STATES.

At a Court of Claims held in the City of Washington on the second day of June, 1913, judgment was ordered to be entered as follows:

The Court on due consideration of the premises find for the defendant and do order, adjudge and decree, that the petition of the claimant, Lewis E. Smoot, be and the same is hereby dismissed.

BY THE COURT.

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#### VII. *Application for, and Allowance of, Appeal.*

Comes now the claimant and petitioner, Lewis E. Smoot, by William G. Johnson, his attorney and counsel of record herein, and conceiving that error hath been committed in the final judgment entered in said cause on June 2, 1913, prays an appeal from the said judgment to the Supreme Court of the United States and that the same be allowed as provided by law.

W. G. JOHNSON,

*Attorney and Counsel for Claimant.*

Filed June 16, 1913.

Ordered: That the above appeal be allowed as prayed for.  
June 16, 1913.

BY THE COURT.

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In the Court of Claims.

No. 29903.

LEWIS E. SMOOT

v.

THE UNITED STATES.

I, John Randolph, Assistant Clerk of the Court of Claims, certify that the foregoing are true transcripts of pleadings in the above-entitled cause; of the findings of fact, as finally amended, and conclusion of law; of the opinion of the Court; of the final judgment of the Court; of the application of the claimant for, and the allowance of, an appeal to the Supreme Court of the United States.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court of Claims at Washington City this 25 day of June, A. D., 1913.

[Seal Court of Claims.]

JOHN RANDOLPH,

*Assistant Clerk Court of Claims.*

Endorsed on cover: File No. 23,765. Court of Claims. Term No. 208. Lewis E. Smoot, appellant, vs. The United States. Filed June 25, 1913. File No. 23,765.